SONY

HDC-500 CCU System

HD COLOR CAMERA
HDC-500

HD CAMERA ADAPTOR
HDCA-350

HD CAMERA OPERATIONAL CONTROL UNIT
HDCO-350

HD CAMERA SIGNAL PROCESSOR
HDCS-350

HDVS

OPERATION MANUAL English
1st Edition (Revised 1)
Serial No. 10001 and Higher

For customers in the U.S.A.

WARNING

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

For the customers in Canada
This apparatus complies with the Class A limits for radio noise emissions set out in Radio Interference Regulations.

Pour les utilisateurs au Canada
Cet appareil est conforme aux normes Classe A pour bruits radioélectriques, spécifiés dans le Règlement sur le brouillage radioélectrique.

For HDCS-350
WARNING: Changing the voltage selector may require the use of a different line cord or attachment plug, or both.
To reduce the risk of fire or electric shock, refer servicing to qualified service personnel.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Bescheinigung des Herstellers/Importeurs
Hiermit wird bescheinigt, daß die
HD-Farbkamera HDC-500
HD-Kameraadapter HDCA-350
HD-Kamera-Betriebssteuereinheit HDCO-350
HD-Kamera-Signalprozessor HDCS-350
in Übereinstimmung mit den Bestimmungen der BMPT-Amtsblatt Vfg 243/1991, Vfg 46/1992 funkentstört sind. Der vorschriftsmäßige Betrieb mancher Geräte (z.B.Meßsender) kann allerdings gewissen Einschränkungen unterliegen. Beachten Sie deshalb die Hinweise in der Bedienugsanleitung.

Dem Bundesamt für Zulassungen in der Telekommunikation wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

Name und Anschrift des Herstellers/Importeurs:
Sony Deutschland GmbH
Hugo Eckener Str. 20
D-5000 Köln 30

Hinweis
Gemäß der Amtsblätter des BMPT Nrn. 61/1991 und 6/1992 wird der Betreiber darauf aufmerksam gemacht, daß die von ihm mit diesem Gerät zusammengestellte Anlage auch den technischen Bestimmungen dieser Amtsblätter genügen muß.

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About this Manual

This manual is provided as a guidebook for users of the CCU operation system of the Sony high definition color camera system. This section covers the purpose and organization of the manual. Reading this first will help you decide to which of the other chapters you should devote the most time, depending on your experience with professional color camera systems.

Purpose of this manual

This manual contains all the information you need to operate the CCU operation system (also called "the system" in this manual), including the names and functions of the component parts, details of necessary preparation work, settings and adjustments, the procedures involved in recording using an external VTR, and the general operation. Also, this manual contains all necessary information required to make use of other features of the system, such as how to install optional accessories.

The system is also supplied with a maintenance manual in addition to this operation manual. Read the maintenance manual for details of how to use the troubleshooting functions, internal circuits, internal switches and so on.

Intended readership

The manual is aimed at professionals such as camera engineers and video engineers at broadcasting stations or production houses. The manual is written assuming that the user has experience of broadcasting equipment. If you are an experienced user of broadcasting equipment, reading "7-1 Location and Function of Parts and Controls" will provide you with enough background to grasp the principal functions of the system. If you have limited experience in broadcasting equipment, you should preferably read through the entire manual. The Glossary at the end will help you understand the meaning of the technical terms used herein. The precautions you must observe when using your system are given in "2-1 Precautions on Use." Read this chapter regardless of whether you are professional or beginner.

Organization of this manual

The following is a brief summary of the chapters and appendixes constituting this manual. Note, however, that the first page of each chapter also summarizes the contents of that chapter.

Chapter 1 Overview
Describes the principal features and functions of the system.

Chapter 2 Setting up the System
Describes system installation and connection. Also described are safety precautions that you should be aware of.

Chapter 3 Starting the System
Describes system start-up, output switching and adjustment of the iris and focus.

Chapter 4 Setting Up
Describes the settings and adjustments to be done prior to recording.

Chapter 5 File Operation
Describes the storing and calling the reference file, lens files and set-up/scene data files.

Chapter 6 Recording
Describes the starting/stopping of recording and intercom operation.

Chapter 7 Appendixes
Gives the names and functions of the controls and other parts.
Also, provides the following information
- Warning system
- Specifications
- Glossary

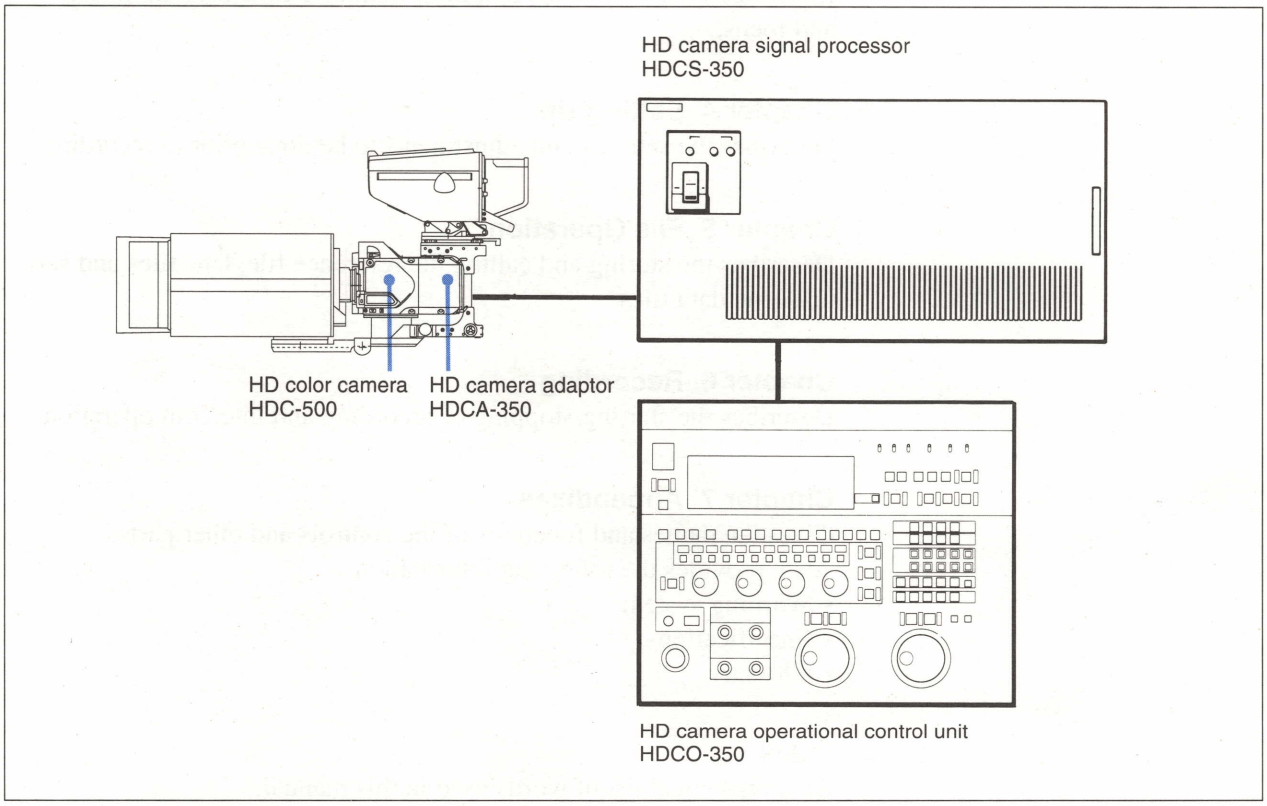
Index
An alphabetical list of words used in this manual.

Conventions used in the manual

Component name

The following abbreviations may be used on switches and EL (Electro Luminescent)Display as well as in manuals to indicate each component and part of the camera system.

Type	Switch/EL Display indication	Operation manual indication
HDC-500	CHU (Camera head unit)	Camera
HDCA-350	ADP (Adaptor)	Camera adaptor
HDCO-350	Panel	Panel
HDCS-350	CCU (camera control unit)	CCU



System components

Abbreviations

The following abbreviations are mainly used for switch indication and the EL Display.

Abbreviation	Meaning
WHT	White
BLK	Black

Any abbreviations other than the above are explained on the pages where they appear.

Technical terms

Technical terms are explained in the body of the text wherever they first appear, or at the foot of the page. You may also consult the glossary of terms at the end of the manual.

Cross references

Throughout the manual you will find italicized references to sections of the manual that contains supplementary information.

Important notes

Be sure to read the sections of the manual marked **Note** . They explain points that you should be aware of to operate the system correctly and prevent malfunctions. Also, read "2-1 Precautions on Use" to ensure satisfactory operation, prevent malfunctions and avoid the occurrence of problems.

Index

Use the index in addition to the tables of contents and the first page of each chapter to find information you need when using the system in the field.

Related manual

The system is also supplied with a maintenance manual. The maintenance manual describes the necessary maintenance operations and provides relevant technical information.

Chapter 1 Overview

This chapter describes the special features and system configuration that you should be aware of prior to operating the unit.

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1-1 Overview

1-1-1 Introduction to the System

This system is a studio/OB (outside broadcast) HD color camera CCU operation system designed for relay or recording HD broadcast programs in a studio or with a relay van/OB van.

Application

This system is designed for producing high-quality HD images. It features full operational facilities to cover all shooting applications from full-scale studio use to the applications shown below.

- Broadcasting/producing HD broadcast programs in full-scale studios and production houses.
- Producing presentation/promotional video programs
- Producing commercial films
- Shooting art objects
- Medical research systems such as an operating microscopes
- Producing movie films
- Computer graphics systems
- Printing systems

Description of the Camera

HAD sensor

The camera incorporates three of 2 million pixel 1-inch FIT type Hyper HAD[1)] sensor CCD (Charge Coupled Device). This CCD reduces noise, smearing and after-images. It also eliminates highlight burn-in, ensuring high picture quality. The application of conventional HD color camera CCU system to the movie production field has been limited because of problems of after-images and highlight burn-in. However, this system can be applied to movie production field as well as broadcasting.

High sensitivity, less smearing and high S/N

The FIT type Hyper HAD sensor CCD enables reduced smearing, high sensitivity and a high signal-to-noise ratio. High sensitivity allows you to shoot subjects in dark surroundings, even under severe shooting condition where the light for the camera is inhibited, such as opera relay broadcasts. Also, the reduction of smear allows you to shoot subjects under bright lighting.

1) **Hyper HAD:** Hyper Hole-Accumulated Diode
Hyper HAD ™ is a registered trademark of Sony Corporation.

Light-weight and compact

Use of the CCD also allows the camera to be small and lightweight and have low power consumption. By separating the camera head from the camera adaptor, the system can be used as a stand-alone system, too. Thus, in addition to the application of the system to studio work and movie production, where the camera is used with a tripod, this compact system can be used for field production where the camera is carried with a shoulder pad.

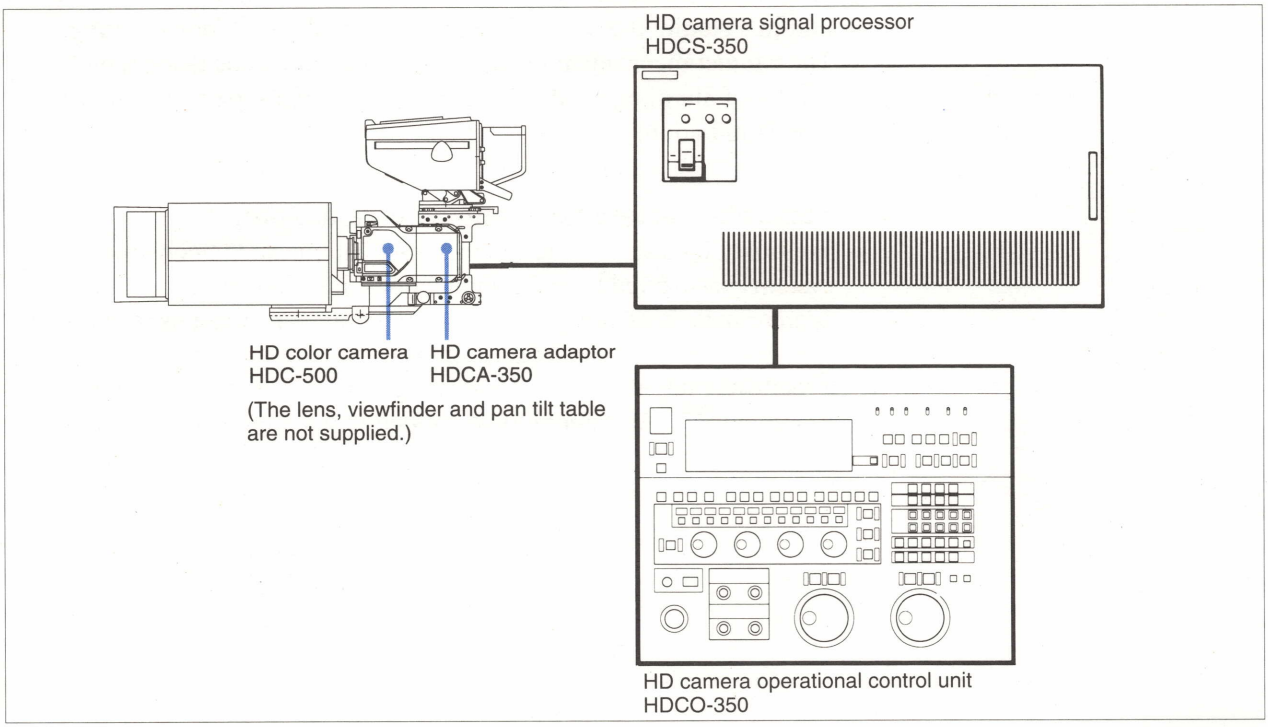
Description of CCU

The CCU features new auto setup system for which a special chart for setup is not necessary and many manual adjustments such as digital image enhancement. Also, the CCU features a super EVS (Enhanced Vertical Definition System) reading function to improve the vertical resolution degree at shutter speed setting, frame/field detecting and field reading. Application of the CCD allows the system to omit compensation for registration/distortion/dark shading, as are required for conventional pickup-tube cameras.

System configuration

This system consists of the following units.

- HDC-500 HD color camera
- HDCA-350 HD camera adaptor
- HDCO-350 HD camera operational control unit
- HDCS-350 HD camera signal processor



System configuration

1-2 Features

1-2-1 Features of the HDC-500 HD Color Camera

Performance features

High sensitivity

Use of the FIT type Hyper HAD sensor CCD enables high sensitivity. The sensitivity is three times better than that of a conventional unit (Sony HDC-300). Thus, you can shoot dark scene, such as an opera stage, where previously it was difficult to shoot because the limited camera light.

High signal-to-noise ratio

By using the HAD sensor, dark current noise is reduced. Reduction of the dark current results in a corresponding reduction in the fixed pattern noise and a high signal-to-noise ratio. The signal-to-noise ratio is three times better than that of a conventional unit (HDC-300).

Reduction of smear

The FIT type CCD enables the system to minimize smearing. Thus, you can shoot a subject or scene under the bright lighting conditions.

Mechanical features

Compact, light-weight and strong

The camera is 40% smaller and 30% lighter, compared with a conventional unit (Sony HDC-300). Thus, in addition to using the unit in a studio, the unit can be easily applied to outdoor shooting. The cabinet mechanism features a strong monocoque design, built mostly of aluminum. Magnesium is used in those parts not subjected to heat radiation.

Separate camera head and camera adaptor

To satisfy the user's wide-ranging applications and to construct systems best suited to those applications, the camera head and camera adaptor have been designed as separate units. You can use the unit by carrying it on your shoulder for producing programs and as the part of a medical study system or computer graphics system. This two-part design allows the camera to be applied to wide range of applications.

Interface features

Support 1-inch lens

You can use the 1-inch lens designed for the HDC-300 system.

Operation features

Low optical axis height

In addition to the unit's compactness and light weight, its low optical axis mechanism offers you a variety of shooting styles.

Carrying handles

Grip for low-angle shooting

You can carry the unit by holding this grip. Also, you can shoot a subject from low angles by holding the unit with this grip.

Accessories

You can attach accessories, such as a light, to the unit's 1/4-inch screw tap.

Superior operation

You can attach a carrying strap. You can easily attach and remove the camera head. By also using the shoulder pad, you can carry the unit on your shoulder as a part of a multi-system.

Tripod attachment

Superior operation

The tripod adaptor allows you to attach the unit to any tripod on the market. You can attach the camera head to the tripod and remove the the unit from the tripod easily. You can also use the tripod as a base for attaching peripheral accessories. Since the optical axis of the camera is kept low by using the tripod, you can set up the system easily.

Mount for 7-inch viewfinder

The unit is provided with a mount for attaching a large 7-inch viewfinder. This is used when the unit is applied to studio/OB production systems.

1-2 Features

1-2-2 Features of the HDCA-350 HD Camera Adaptor

Mechanical features

Separate camera head and camera adaptor

To enable a single camera to be applied to various systems/uses, the camera head and the camera adaptor have been designed to be separated.

Rotatable camera connector block

The camera connector block is rotatable to save space and to enable easy connection or disconnection of connectors.

Interface features

Power supply connector for 7-inch viewfinder

The unit is provided with a power supply connector for the large 7-inch viewfinder, to enable its application to indoor production systems such as in a studio.

Connector for a monochrome monitor

The unit is provided with the connector for a monochrome monitor to enable monitoring in the field. You can monitor any one of G/B/R/Y signals.

DC OUT connector

The unit is provided with a DC OUT connector for the power supply of the script lamp

Two intercom connectors

The unit is provided with two intercom connectors: one for camera operator and the other is for the video engineer/tracker/focus puller.

1-2-3 Features of the HDCO-350 HD Camera Operational Control Unit

Auto setup system

Auto setup function

Setup at system start-up is performed instantaneously. This setup would take 15 minutes or more with a conventional pickup-tube camera. Also, conventional auto setup systems require a special chart. This system generates the setup test signals by its internal circuits. Thus, a special chart for auto setup is not necessary.

Manual setup system

Changing the 5600-K color temperature by the video circuit

The video circuit changes the color temperature without using a color temperature conversion filter. The color balance process improves the signal-to-noise ratio of channel B. This results in improving the picture quality of the color matte.

Shutter speed setting

You can select a shutter speed between 1/60.4 second and 1/350 second or any of 1/100, 1/125, 1/250, 1/350, 1/500, 1/1000 or 1/2000 second, according to the speed of the subject.
This function reduces blur. It is particularly effective for slow motion and stop motion at sports relay broadcast.

Frame/field reading functions

Frame/field mode means the CCD readout mode.

Frame mode

Frame mode is effective for shooting still subjects.
In frame mode, the CCD stores the signal in units of frames and changes the line to read the signal every field. In this mode, the CCD reads the signals completely every line, so that the high vertical resolution is obtained. In frame mode, however, the vertical resolution degree is improved, but the movement resolution degree is reduced.

Field mode

Field mode is effective for shooting fast-moving subjects.
In field mode, the CCD stores the signals in units of fields and outputs signals by adding two lines to the top and bottom of the vertical transfer CCD. The combination of the two lines to be added is changed every field. Since the signals are stored in units of fields, fast-moving subjects are shot with less blur. This mode is effective for shooting fast-moving subjects. In field mode, however, two lines are added unlike the way in which the input signal is read out as it is in frame mode. Thus, the vertical resolution degree is dropped compared with frame mode. In field mode, the sensitivity is improved and the vertical area ring is reduced. The vertical resolution, however, is reduced.

1-2 Features

Super EVS (Enhanced Vertical Definition System)

Super EVS improves the vertical resolution of a moving subject.
In field mode of CCD readout mode, charges accumulated by adjacent lines, used in pairs, are added. Super EVS is used basically with field mode. However, with super EVS, the charges accumulated by adjacent lines, used in pairs, are not simply added before readout. By setting the addition ratio of adjacent lines in pairs, according to the movement of the subject, the vertical resolution is improved, compared with in field mode.
After-image improvement is such that it is the same as in field readout mode. Vertical resolution improvement is such that it is the same as in frame readout mode. The sensitivity, however, drops by up to 1/2 in inverse proportion to the vertical resolution. This is because the charge accumulated by adjacent lines is less than that in field mode. Thus, you can select a vertical resolution improvement ratio from among seven ratios (0.125/0.25/0.375/0.5/0.675/0.75/0.875), according to the subject.

1-2-4 Features of the HDCS-350 HD Camera Signal Processor

Interface features

Four G/B/R (or Y/P_B/P_R) outputs

The unit is provided with four G/B/R (or Y/P_B/P_R) output connectors that can be flexibly assigned to the switcher, VTR, satellite broadcasting circuit, NTSC down converter and so on.

Two return video inputs

The unit is provided with two return video input connectors: one is connected to the program output connector of the switcher. The other can be connected to any desired video input, according to your system or purpose.

Connection to the HDCR-350 remote control panel

You can connect the HDCR-350 remote control panel so that parallel operation with the CCU is possible.

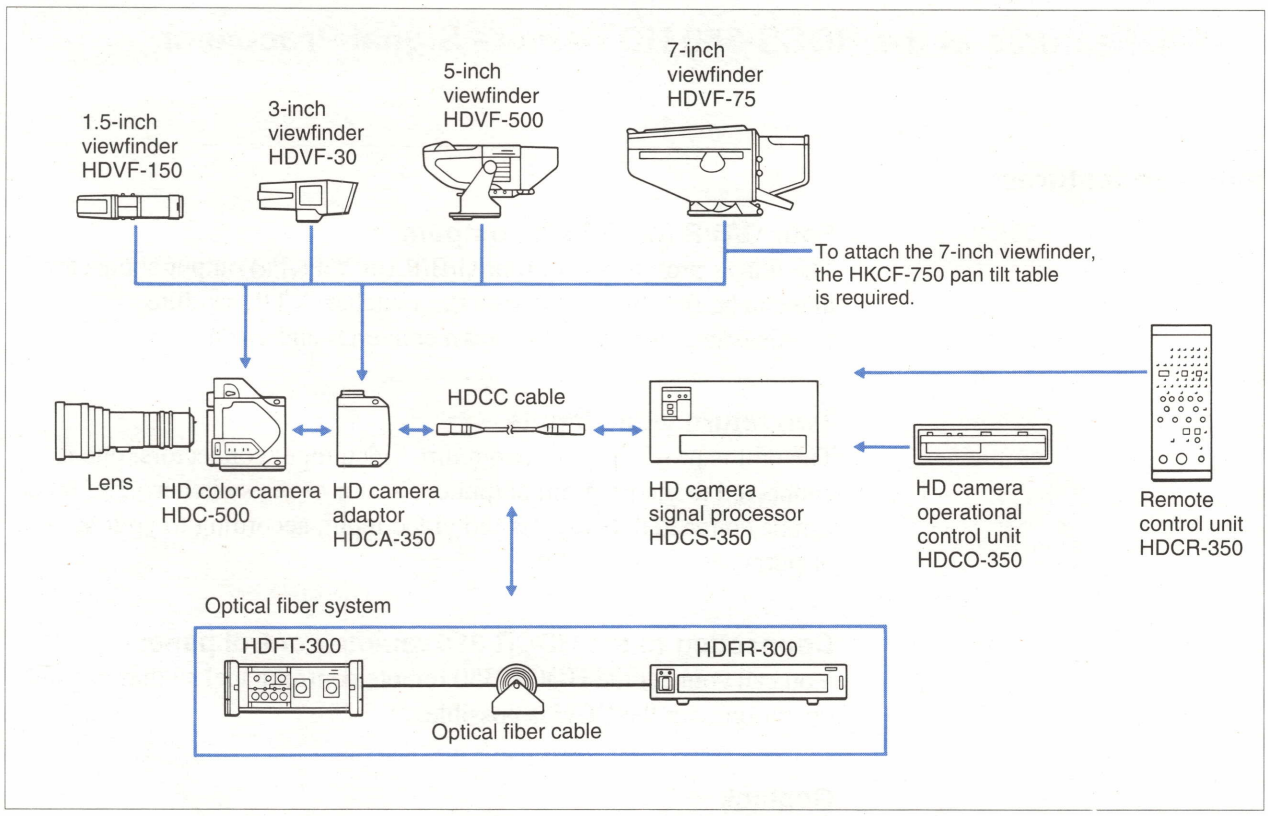
Genlock

The unit is provided with genlock connectors so that genlock in the multi-camera system is possible.

Two-wire/four-wire intercom

You can connect the unit directly to an RTS system and to a ClearCam system via the TW-12 interface, for two-wire type.
You can connect a four-wire intercom via the 19-pin INTERCOM/ PGM/TALLY connector.

1-3 Example System Configuration



System application example

Chapter 2
Setting up the System

This chapter describes system installation and connections. Also described are safety precautions that you should be aware of. Read through this chapter regardless of that you are experienced person or beginner.

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2-1 Precautions on Use

Handling precautions

Protect from impacts.

Do not drop the unit or subject it to severe shocks.

After you finish

Turn off the system power.

Location

Do not store or use the unit under any of the following conditions.

- In excessive heat or cold; permissible temperature range: 0 °C to 40 °C (32 °F to 104 °F).
- In damp or dusty locations
- In locations subject to vibration
- Near strong magnetic fields
- In direct sunlight or near heaters.

Transporting

Protect the unit from impacts by transporting it in its original carton or a protective case.

2-2 Mounting

2-2-1 Mounting the HDCO-350 HD Camera Operational Control Unit

Mounting types

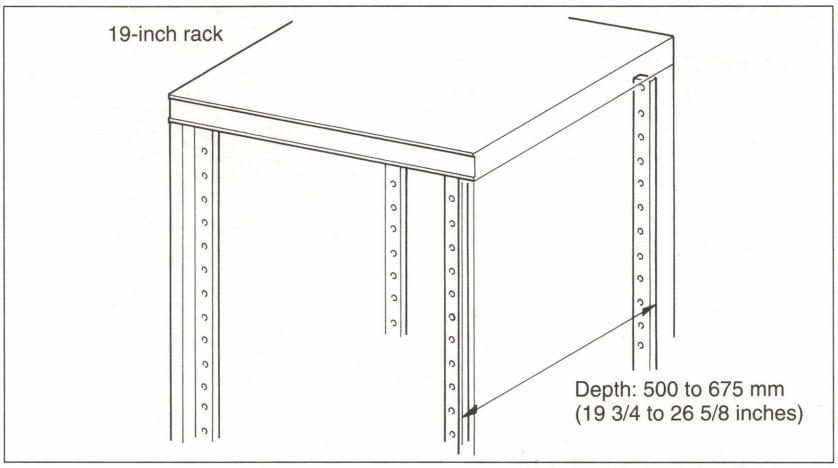
Three types of mounting are possible.

- 19-inch rack mount
  Pull out the panel during use. You can remove it from the rack temporarily.
- Table mount
- Desktop use

19-inch rack mount

Standard rack

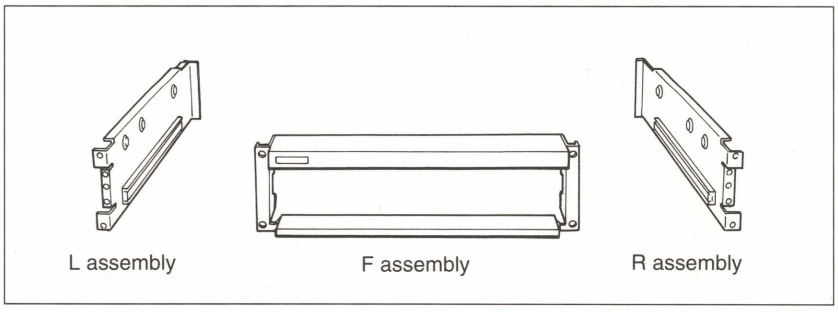
You can use the following standard 19-inch rack (EIA standard, universal spanning - M5 type).



Sony recommends the Sony SU-860 rack series.

Supplied parts

The system is supplied with the following rack mount fittings.



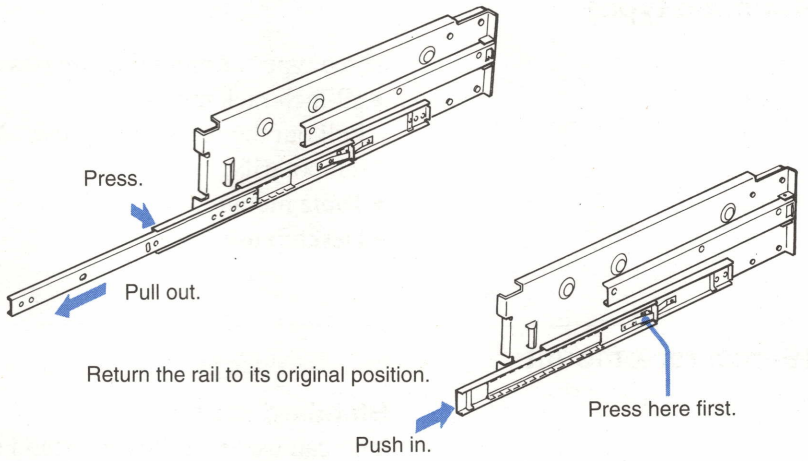
In addition to the above, the following parts are also supplied.

- Screws: +B5 x 8 and +RK5 x 8
- Decorative washers

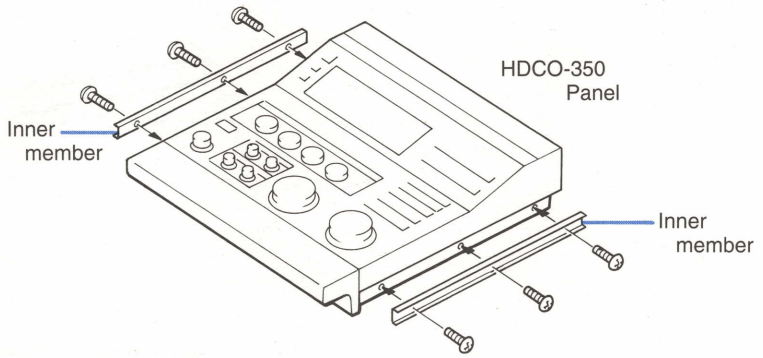
Mounting procedure

Mount the Panel as follows.

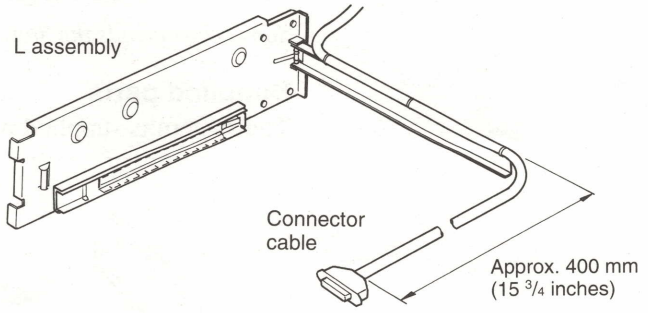
1 Remove the inner members from the L and R assemblies.



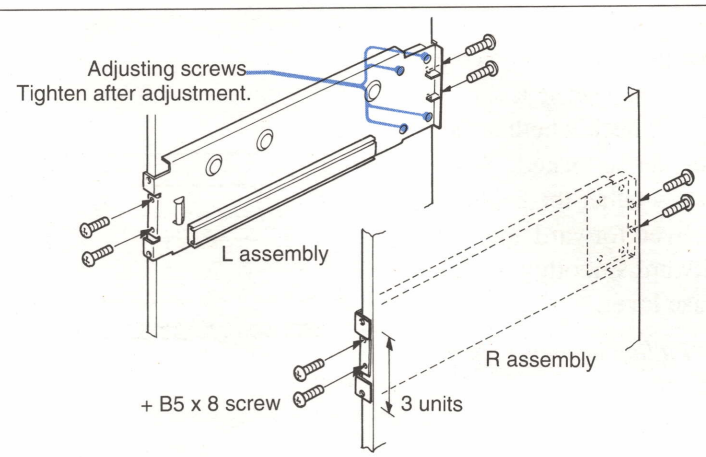
2 Mount the inner members to the panel.



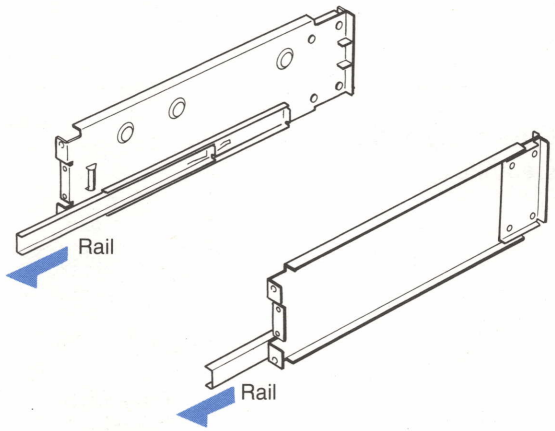
3 Attach the connector cable (supplied with the HDCS-350) to the cable clamp of the L assembly.



4 Fix both L and R assemblies temporarily.

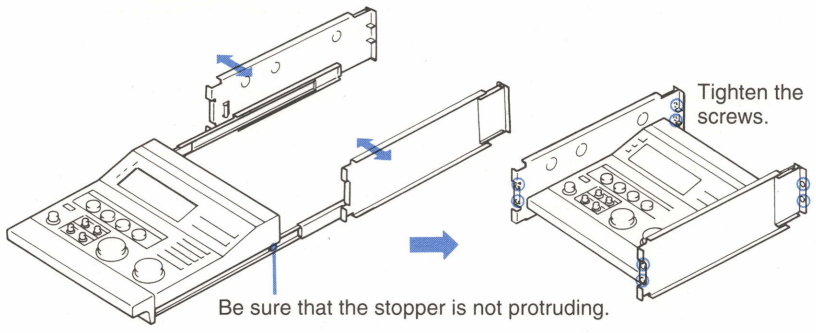


5 Pull the rail out fully.



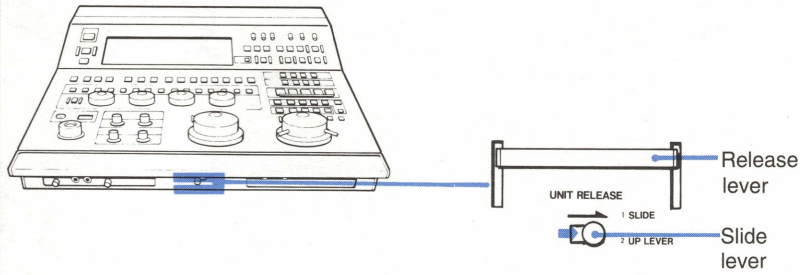
6 Mount the panel unit temporarily.

Move both the L and R assemblies to the right and left, using the panel as a guide.

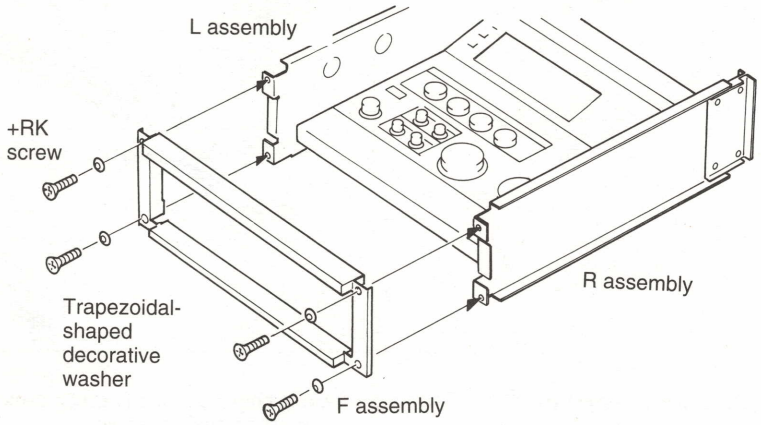


7 Move the slide lever to the right. The release lever drops. Check whether the panel can be locked. Also check whether the panel can be moved forward and backward smoothly using the release lever.

See "Pulling the panel out of the rack" on page 2-7.



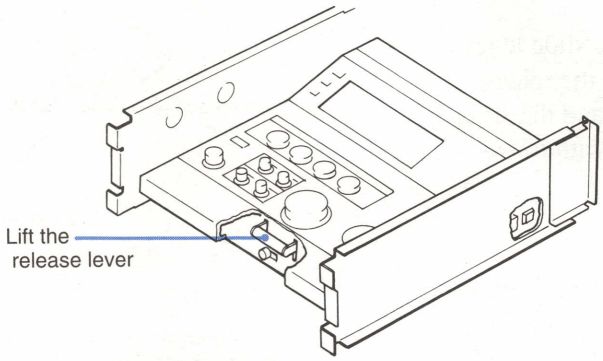
8 Fix the F assembly to the L and R assemblies.



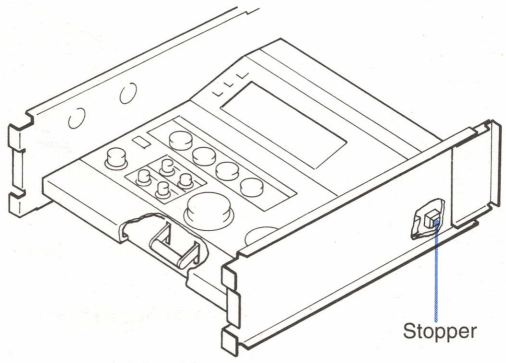
Pulling the panel

Pulling the panel out of the rack

Lift the release lever and pull out the panel. (When the release lever is lifted, the stopper releases the panel lock.)

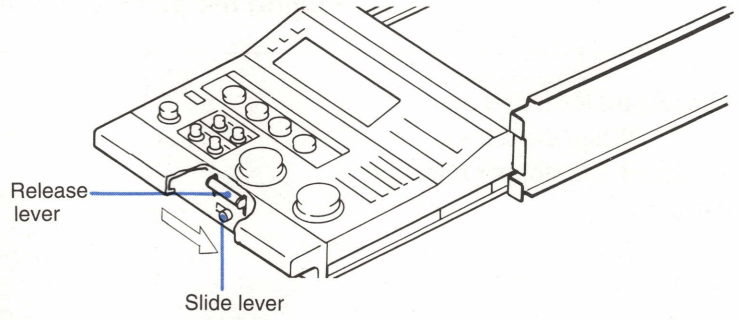


When you pull the panel while the release lever is being lowered, the stopper protrudes when the panel reaches one of the three specified positions. The panel is then locked.

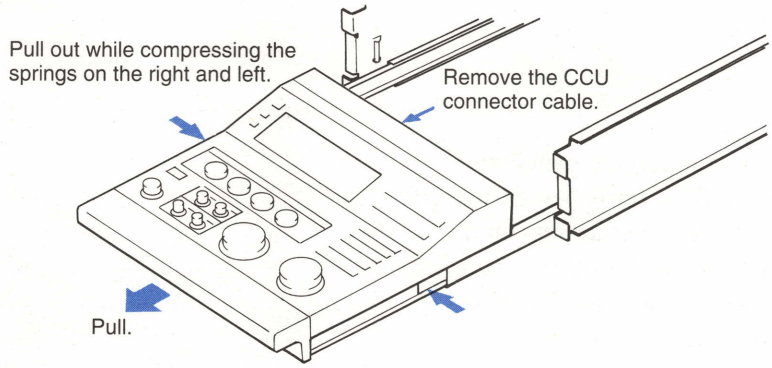


Removing the panel from the rack

1 Move the slide lever to the right while lifting the release lever.
When the slide lever is released, the release lever stays up and the stopper remains withdrawn.



2 Pull out the panel further, then remove the rack as illustrated.



Remounting

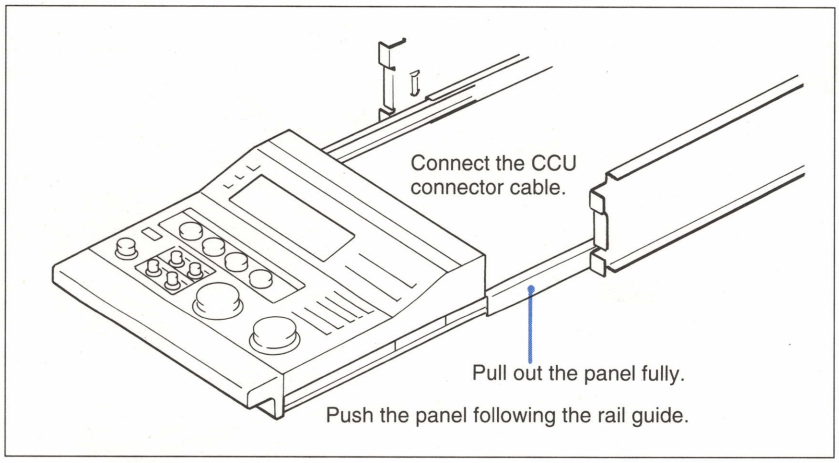
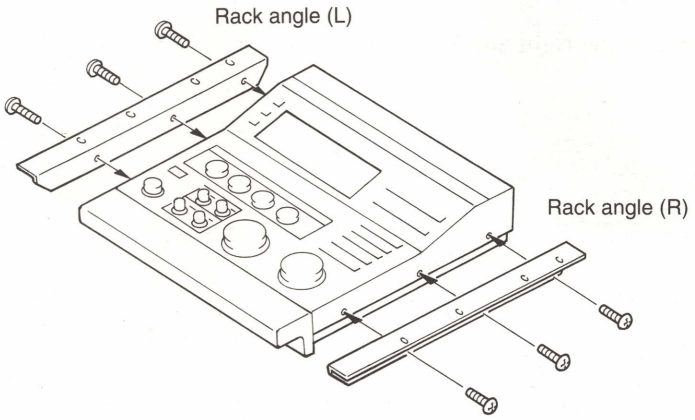
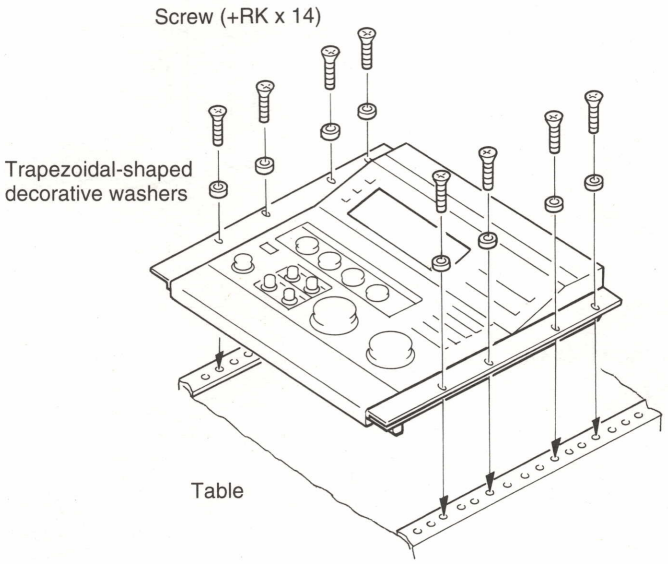


Table mounting

1 Mount the L and R rack angles on the panel.

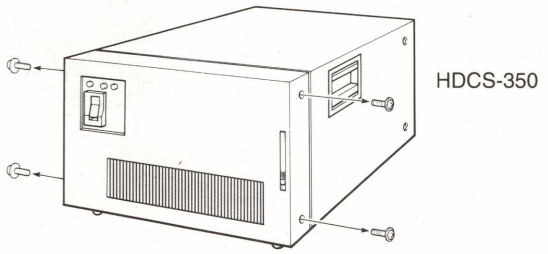


2 Fix the panel on the table.

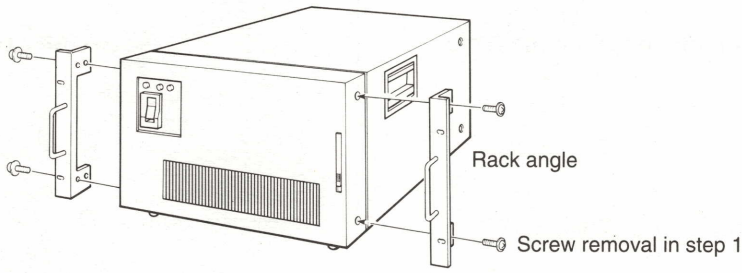


2-2-2 Mounting the HDCS-350 HD Camera Signal Processor

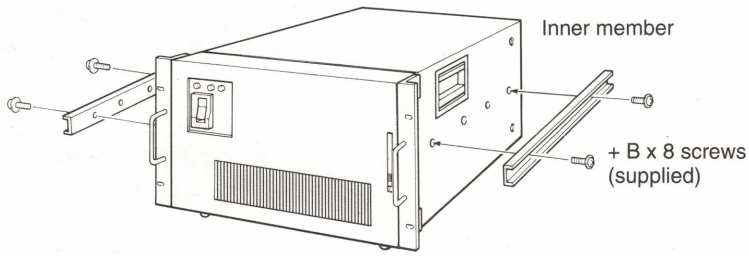
1 Remove the right and left side screws.



2 Mount the rack angles using the screws removed in step 1.

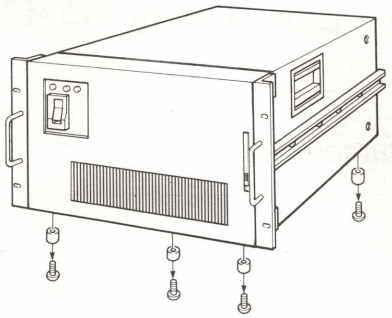


3 Mount the slide rail inner members.



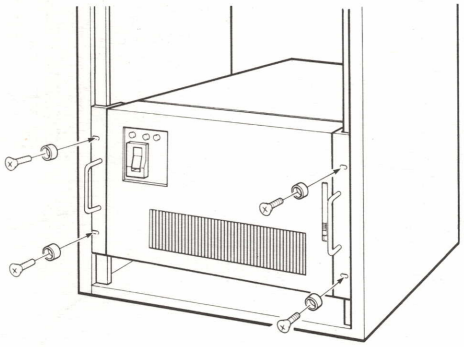
Recommended rails: Japan Accuride type Model 305 14, 15, 18 inch
Japan Accuride type Model 203 16, 22 inch

4 Remove the legs.

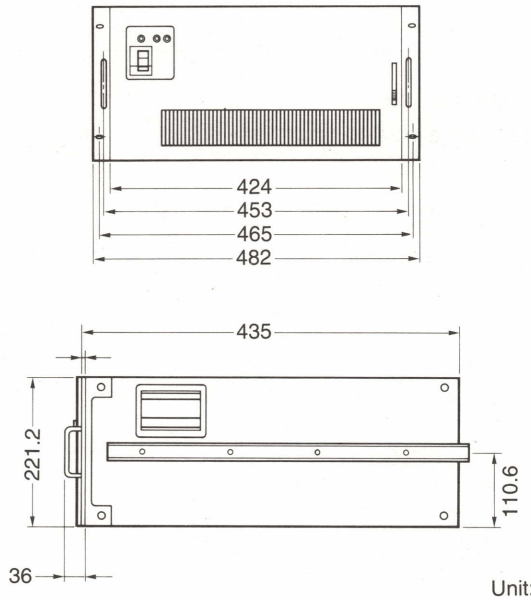


Reattach the screws before replacing the unit in the rack.

5 Secure with screws in the rack.



Dimensions after mounting



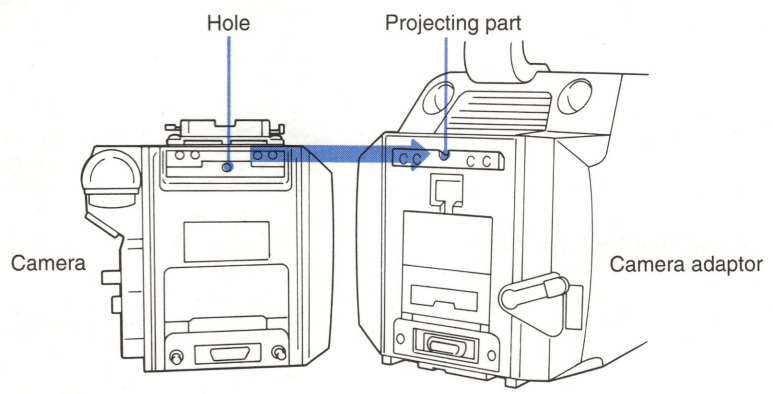
Unit: mm

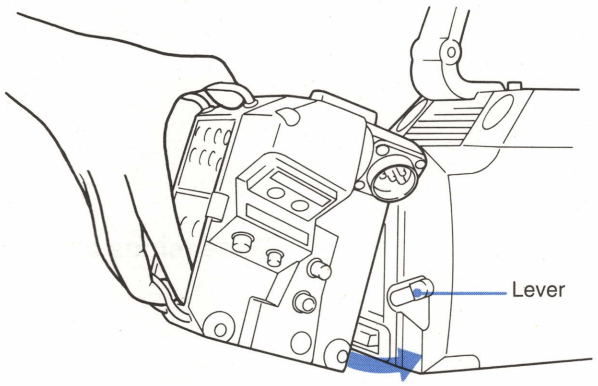
2-3 Attaching

2-3-1 Attaching/Detaching the HD Camera Adaptor

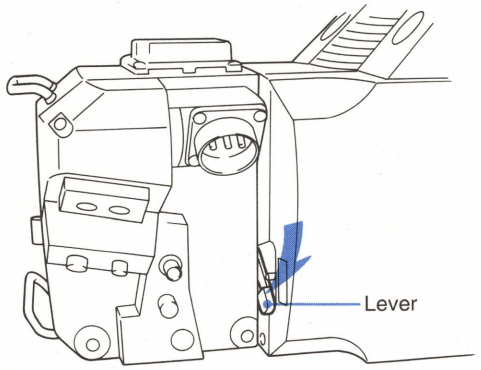
Attaching the camera adaptor

1 Insert the projecting part into the hole.
The lever is prelocked when you hear a click



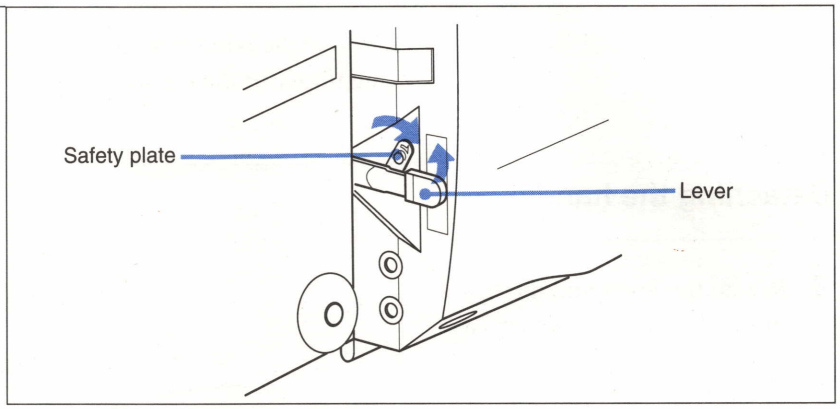


2 Move the lever in the direction of the arrow to fix.



Detaching the camera adaptor

While moving the safety plate down in the right direction, move the lever up (keep the lever as it is up) and detach the camera adaptor.

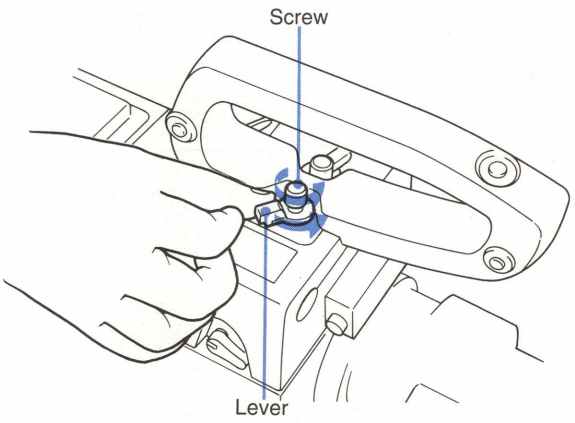


2-3-2 Attaching/Detaching the Handle

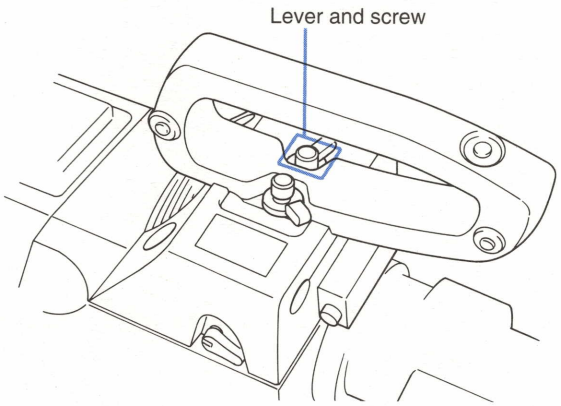
Remove the handle before mounting a large-size lens or the 7-inch viewfinder to the camera head.

Detaching the handle

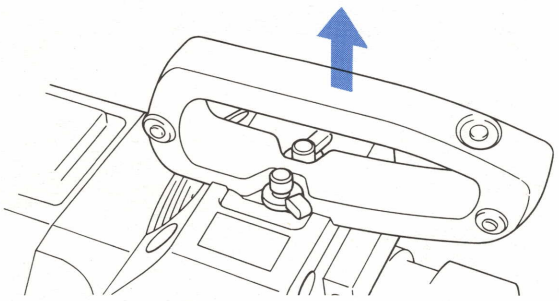
1 Rotate the lever and the screw in the direction of the arrow.



2 Rotate the other lever and the screw in the direction opposite to that in step **1**.



3 Remove the handle.



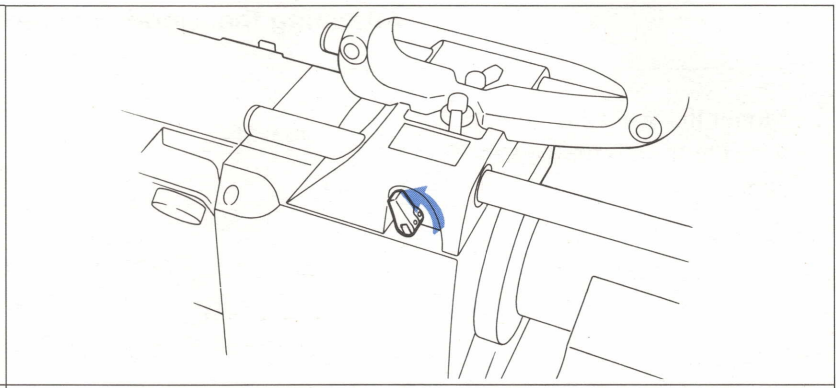
Attaching the handle

Attaching the handle is the reverse of removing the handle.

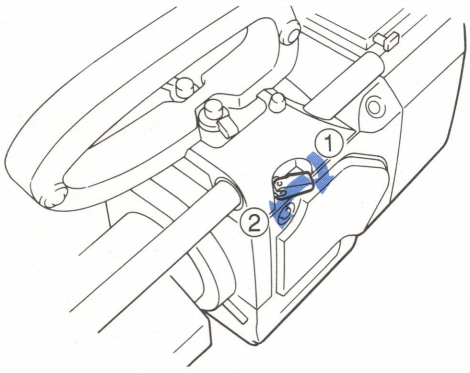
2-3-3 Attaching/Detaching the Rods

Detaching the rods

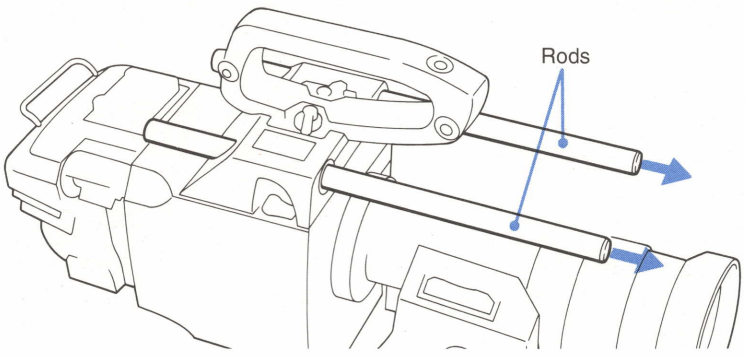
1 Rotate the lever in the direction of the arrow.



2 Pull the other lever in the direction of the arrow ①, then rotate it to the lens side ②.



3 Remove the rods.



Attaching the rods

Attaching the rods is the reverse of detaching the rods.

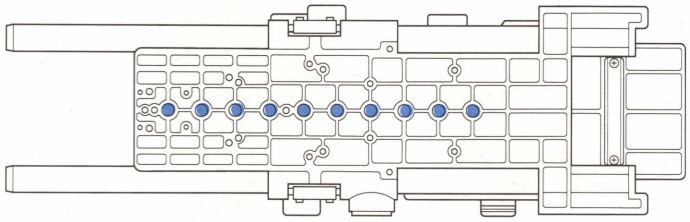
2-3-4 Attaching/Detaching the Tripod

Using a portable lens

Attaching the tripod attachment

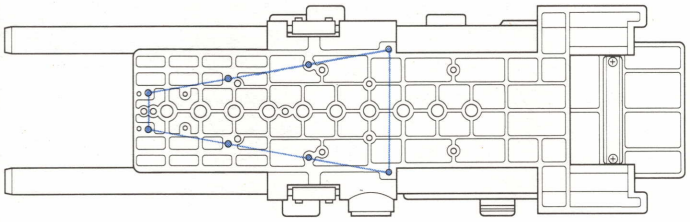
1 Mount the V-wedge (supplied with the tripod) on the tripod attachment.

Vinten type



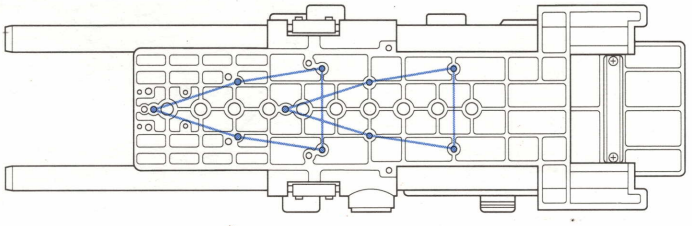
Use a 3/8-inch screws (not supplied).

Shotoku type (TE-02/06)



Use a M5 x 12 cap screws (not supplied).

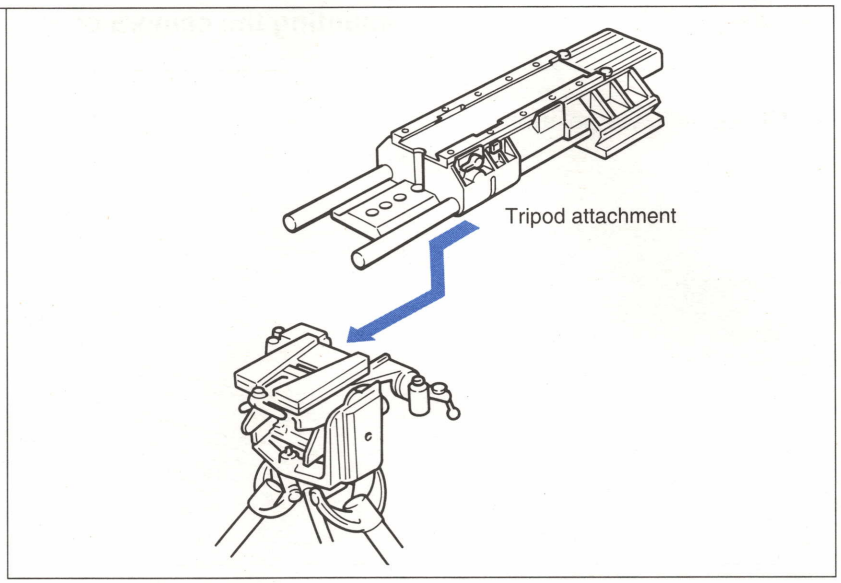
Shotoku type (TE-05)



Use a M5 x 12 cap screws (not supplied).

When not using the V-wedge
The tripod attachment can be mounted on the tripod without the V-wedge.
Use $^{3}/_{8}$-inch screws (not supplied).

2 Mount the tripod attachment on the tripod.

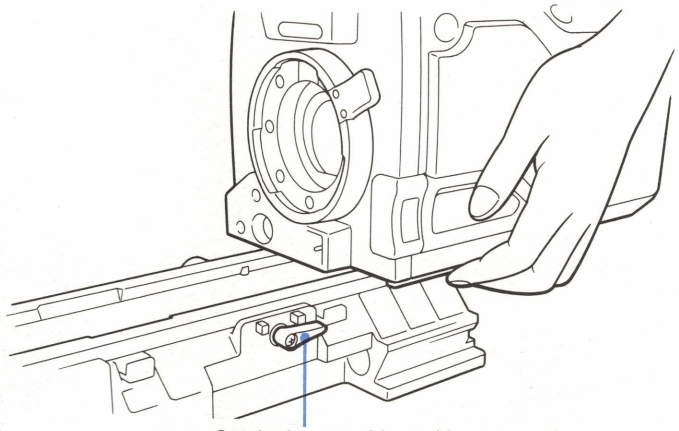


Detaching the tripod attachment

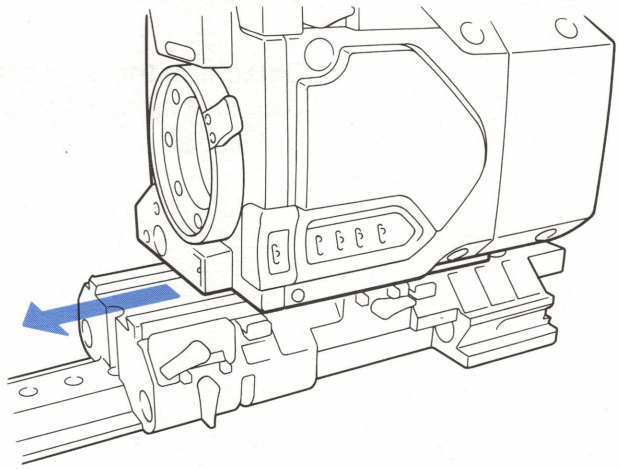
Detaching the tripod attachment is the reverse of attaching the tripod attachment.

Mounting the camera on the tripod

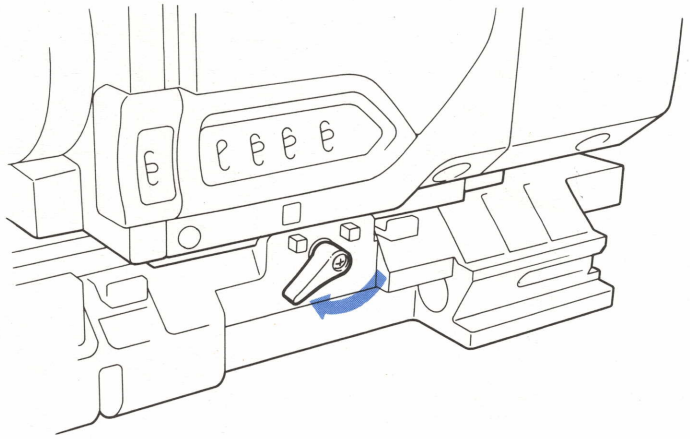
1 Check the lever position.



2 Slide the camera head forward along the groove until it stops.

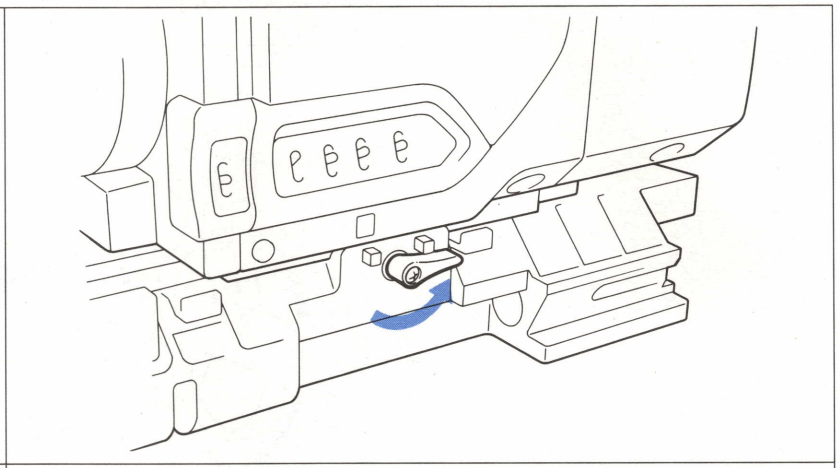


3 Turn the lever in the direction of the arrow to fix it.

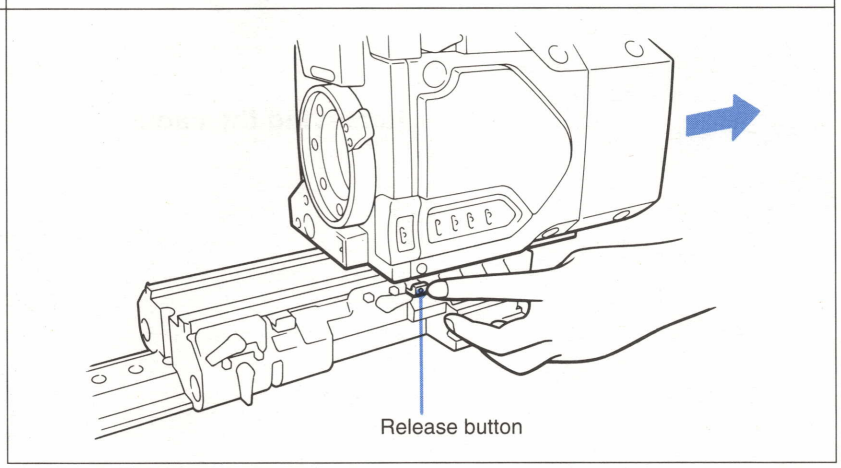


Removing the camera

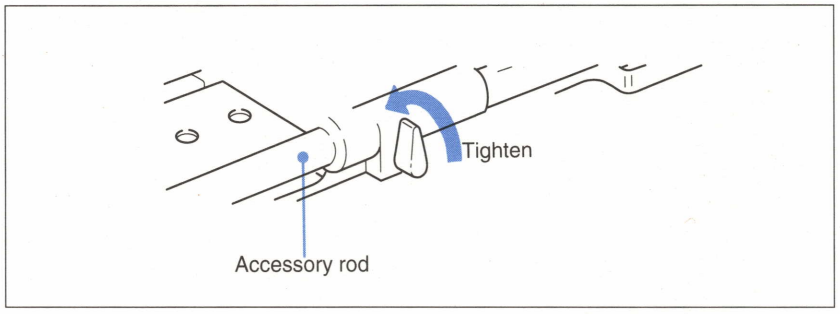
1 Turn the lever in the direction of the arrow.



2 While holding down the release button, remove the camera in the direction of the arrow.

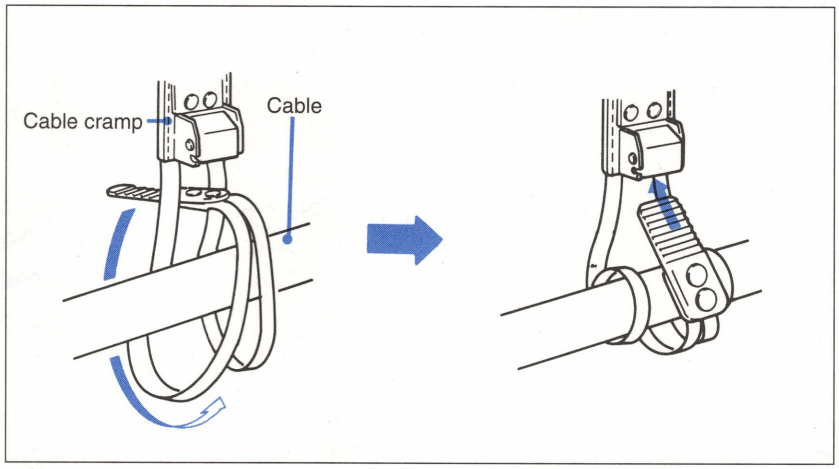


Tightening the accessory rod

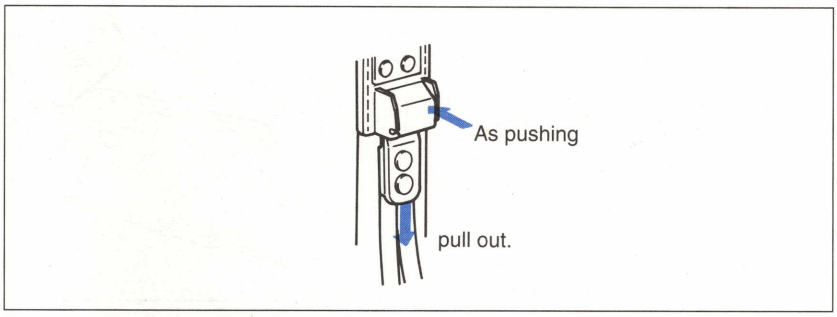


Using the cable clamp

Use the cable clamp to secure the cable to the tripod attachment.

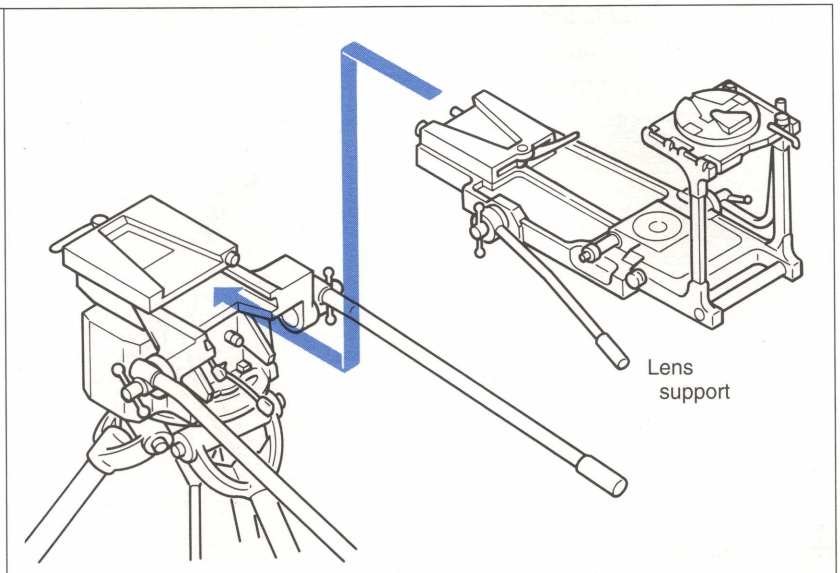


Removing the cable

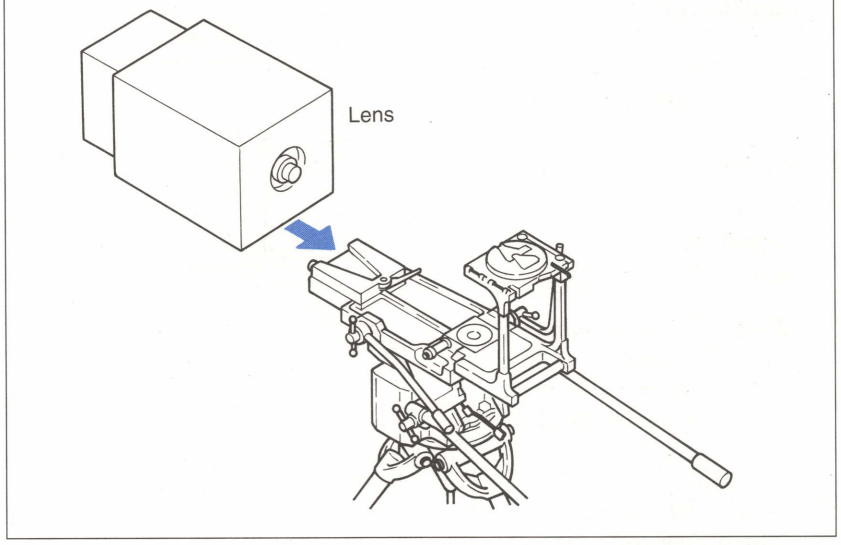


Using a large lens

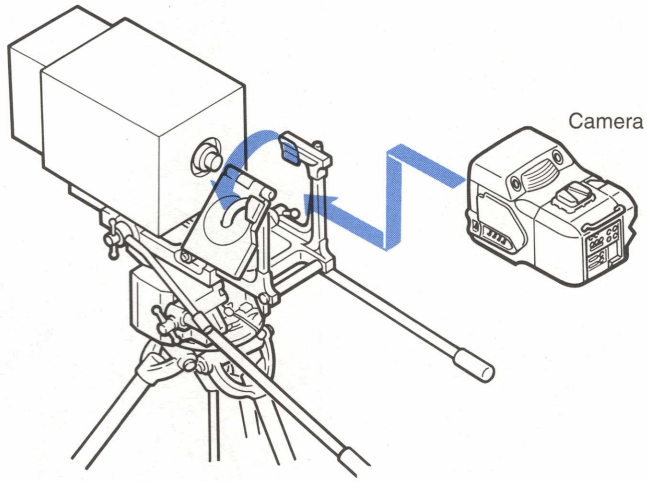
1 Mount the lens support on the tripod.



2 Mount the lens on the lens support.



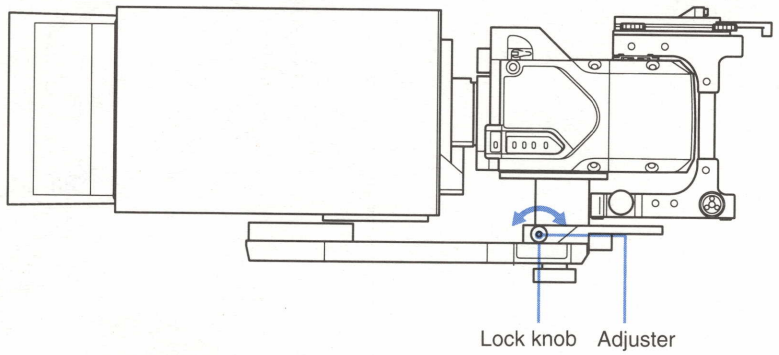
3 Open the top plate of the lens support and place the camera, from which the handle and rods have been removed, onto the lens support.



4 Mount the camera onto the lens while adjusting the height with the adjuster.

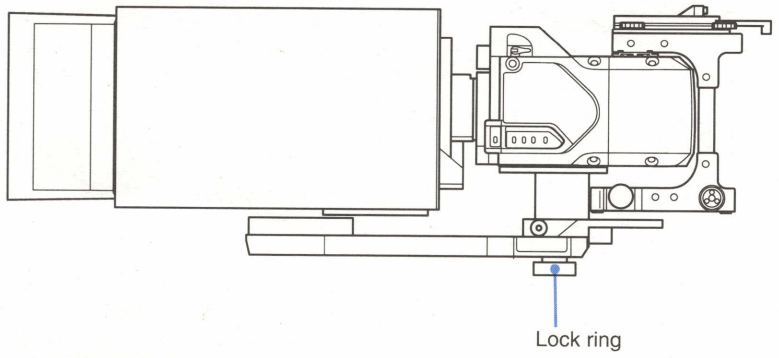
After adjusting the height, it is recommended that the camera be locked with the LOCK knob. It is not necessary to repeat the adjustments every time you mount the head.

The procedure may differ slightly depending on the lens being used. Refer to the operation manual for each lens.

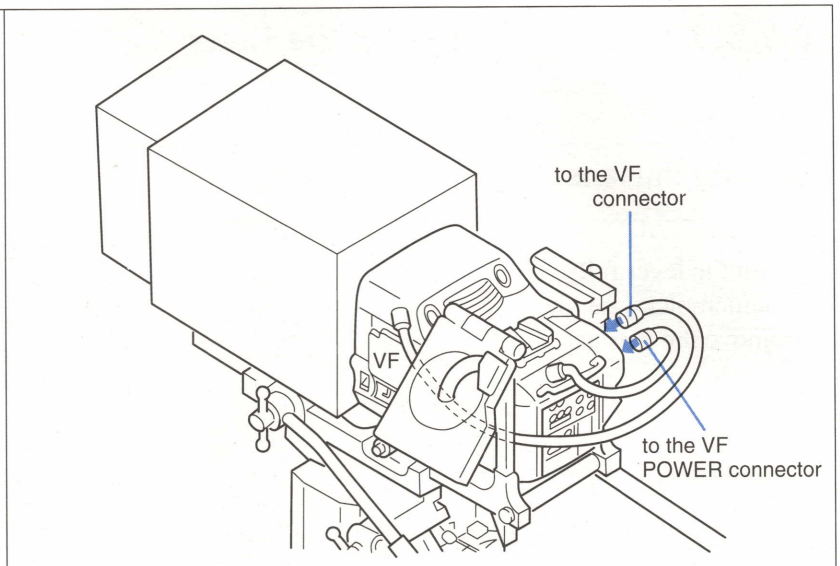


5 Attach the lens support screw, with a lock ring, to the camera bottom. Tighten it to secure the camera.

The procedure may differ slightly depending on the lens being used. Refer to the operation manual for each lens.

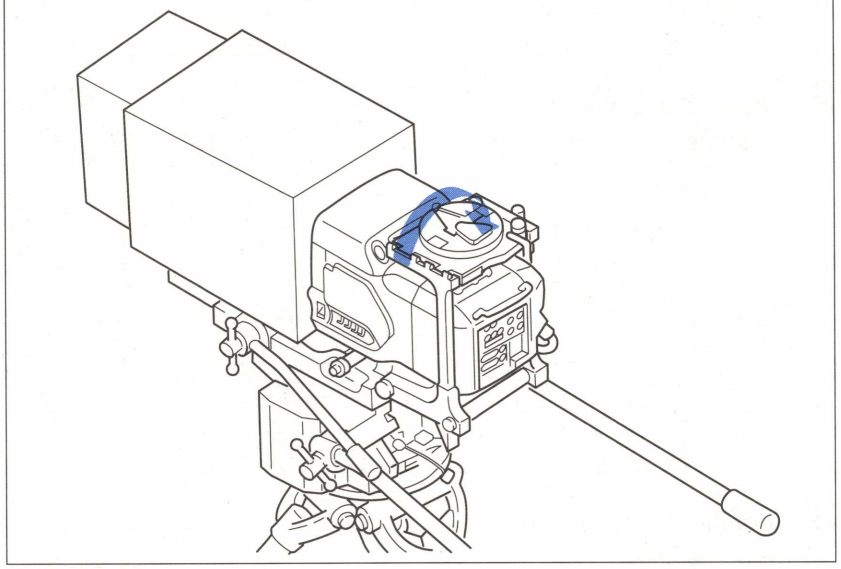


6 Connect the 7-inch viewfinder (HDVF-75) cables.



7 Close the top plate of the lens support.

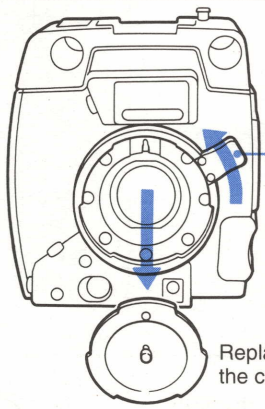
For details of installing the HDVF-75 7-inch viewfinder, refer to its operation and maintenance manual.



2-3-5 Mounting/Removing the Lens

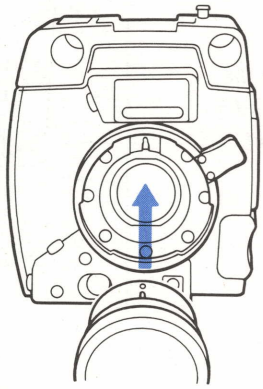
Mounting the lens

1 Turn the lever fully countercolckwise, then remove the lens cap.

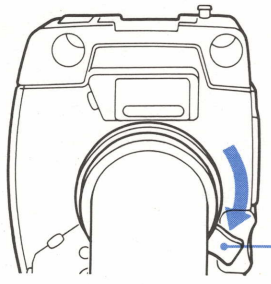


Replace the lens cap when leaving the camera without the lens.

2 Align the lugs with the breaches and insert.



3 Turn the lever fully clockwise to fix the lens.

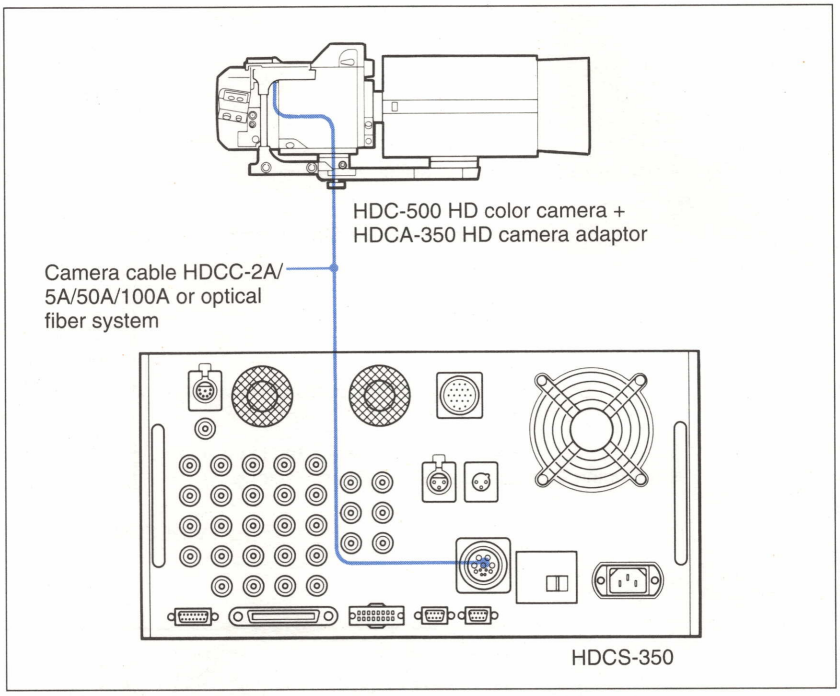


Removing the lens

Removing the lens is the reverse of mounting the lens.

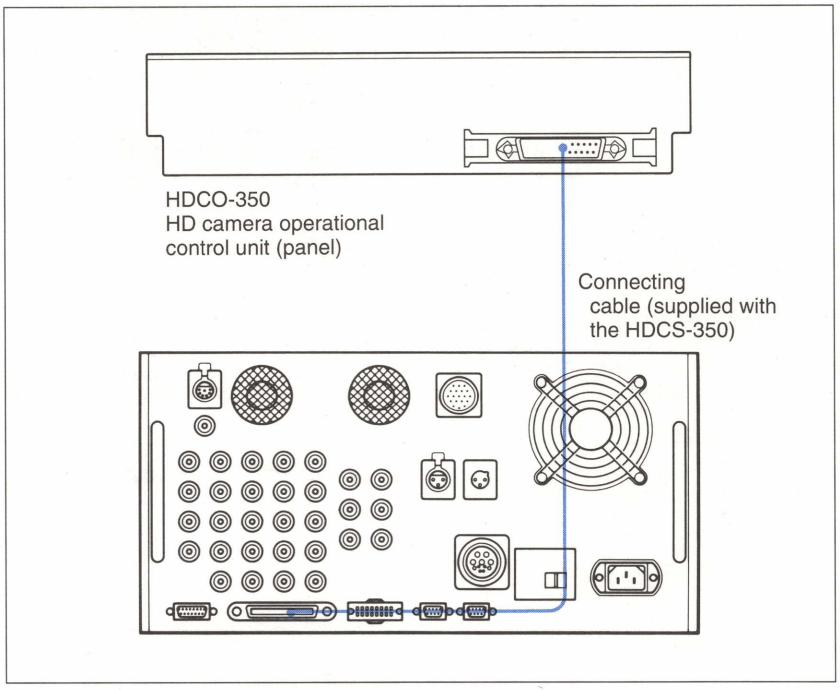
2-4 Connections

2-4-1 Camera Connection



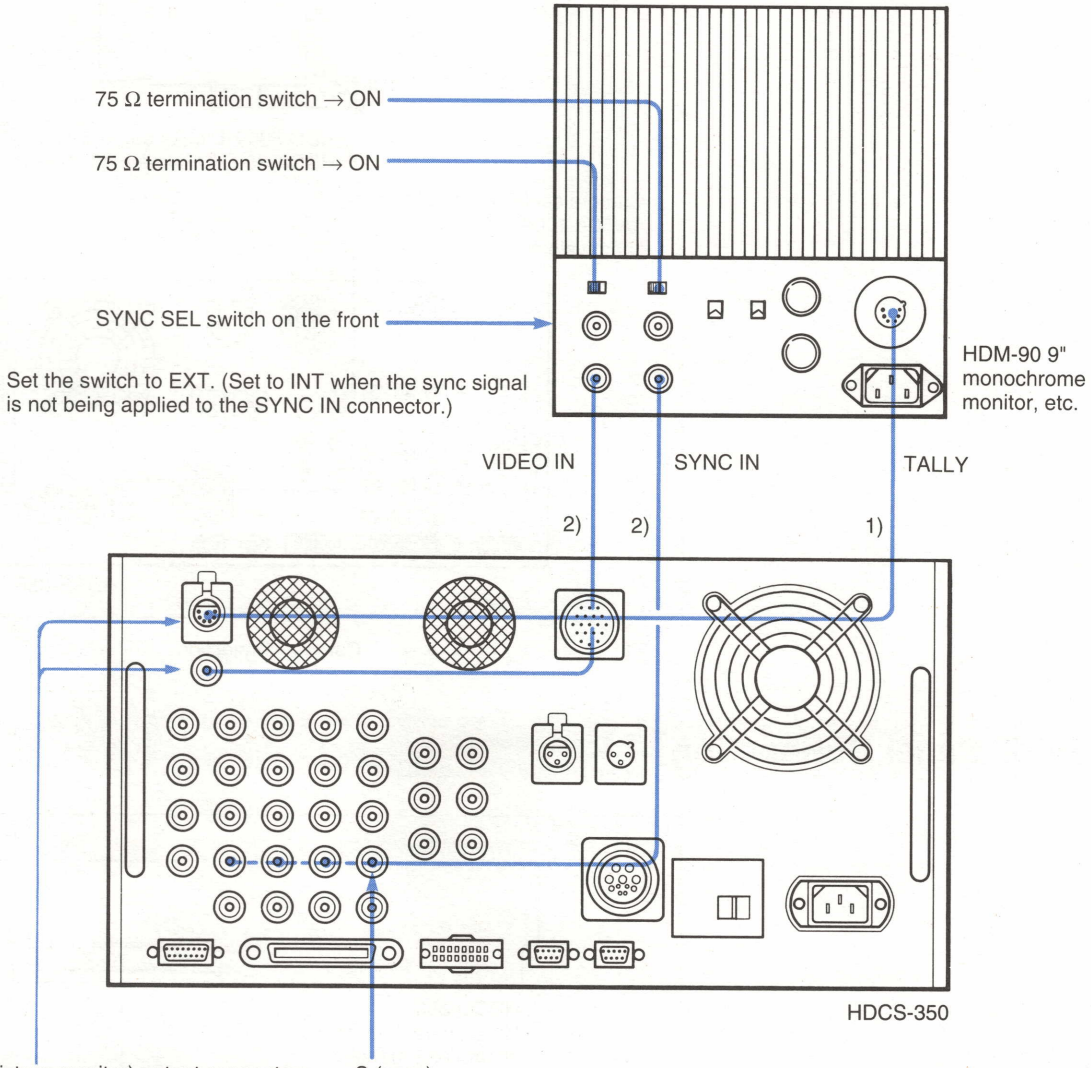
Camera connection

2-4-2 Panel Connection



Panel connection

2-4-3 Monochrome Monitor Connection

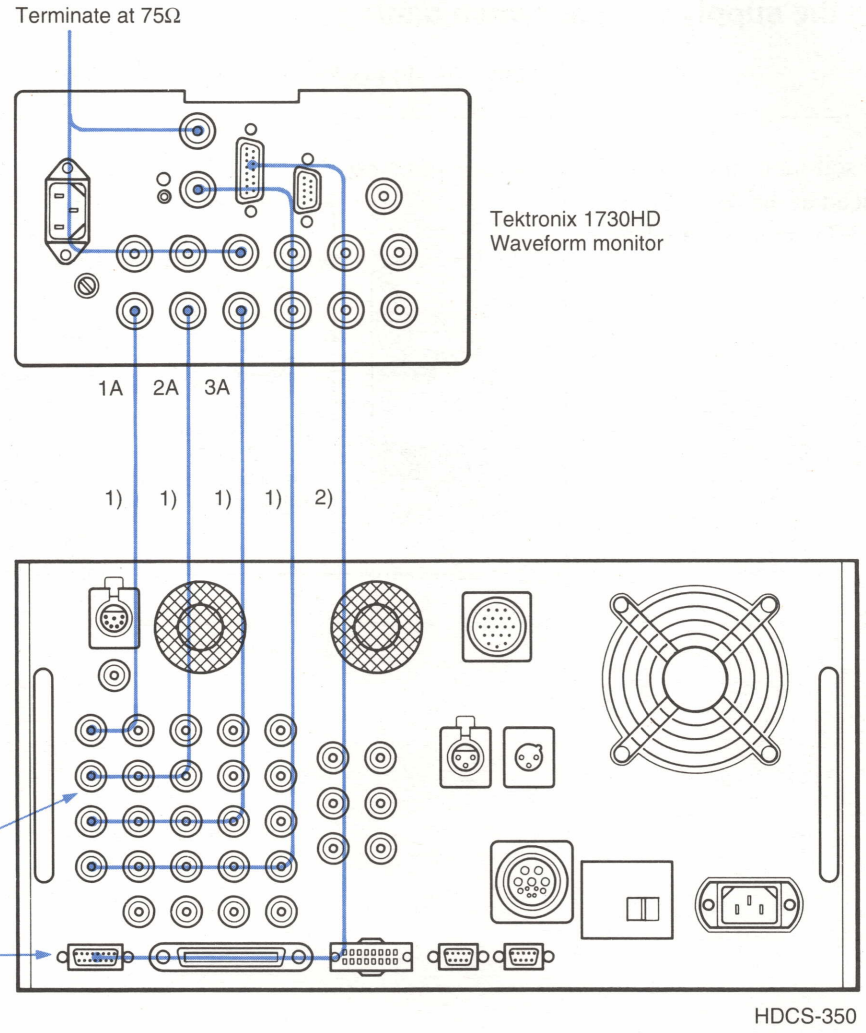

75 Ω termination switch → ON
75 Ω termination switch → ON
SYNC SEL switch on the front
Set the switch to EXT. (Set to INT when the sync signal is not being applied to the SYNC IN connector.)
HDM-90 9" monochrome monitor, etc.
VIDEO IN
SYNC IN
TALLY
2)
2)
1)
HDCS-350
PIC MONI (picture monitor) output connector
S (sync)
SYNC IN can be connected to any of the S connectors.

TALLY	Outputs Tally signal
VIDEO	Outputs (black and white) video signal

1) Tally cable
2) 75 Ω coaxial cable with BNC connectors

Monochrome monitor connection

2-4-4 Waveform Monitor Connection



WF MONI (waveform monitor) output connector	Outputs video and sync signals
WF CONT (waveform control) output connector	Outputs waveform monitor control signal

1) 75 Ω coaxial cable with BNC connectors
2) Connecting cable (supplied with the HDCS-350)

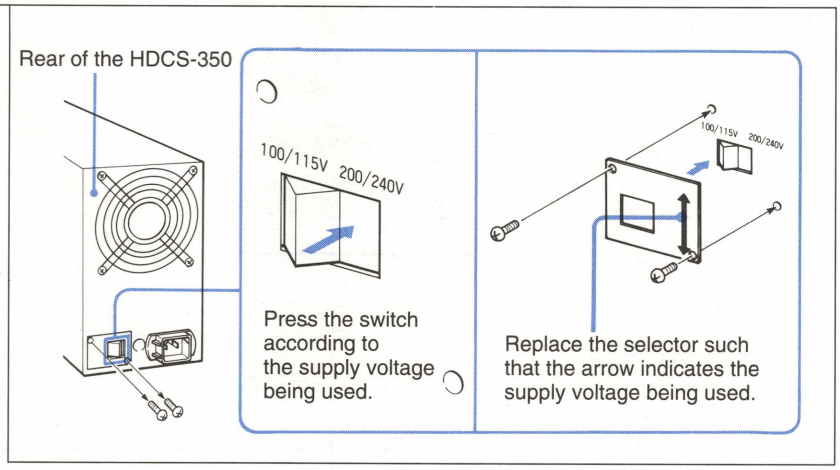
Waveform monitor connection

2-4-5 AC Power Supply Connection

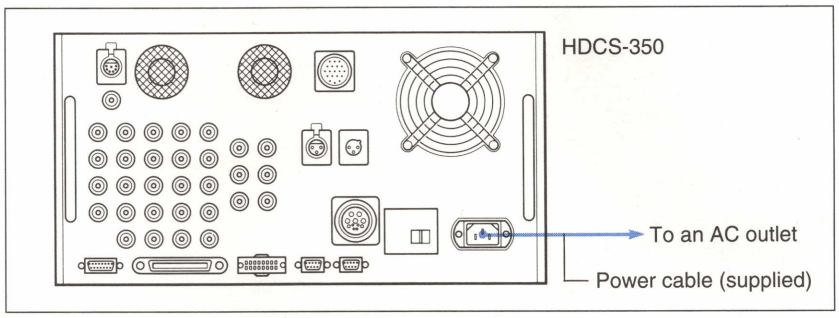
Changing the supply voltage switch setting

Change the supply voltage selector as follows.

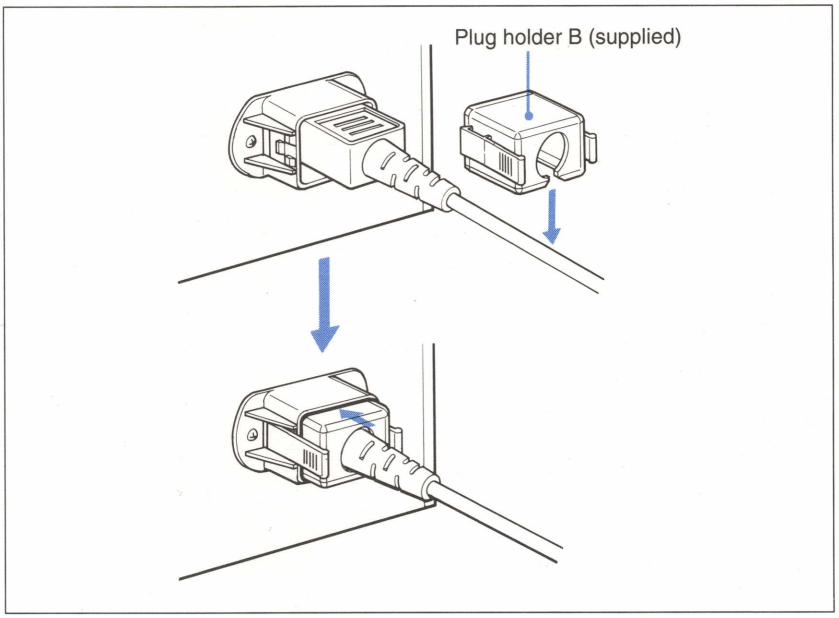
Change the setting of the voltage selector placed at the rear of the HDCS-350 HD camera signal processor.


Rear of the HDCS-350
100/115V 200/240V
Press the switch according to the supply voltage being used.
100/115V 200/240V
Replace the selector such that the arrow indicates the supply voltage being used.

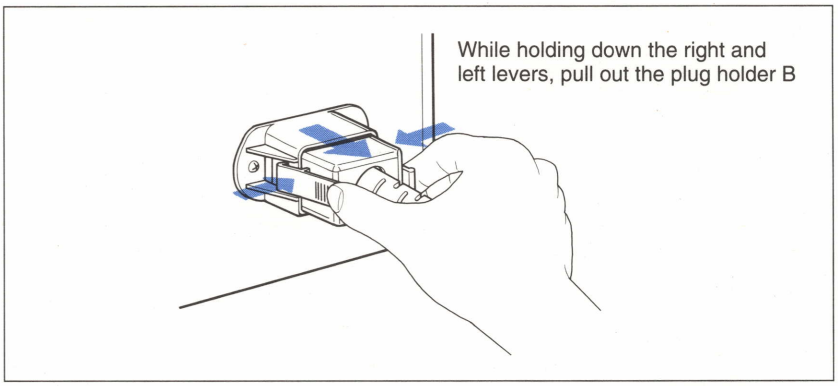
Connections



Fixing the AC power cable



Removing the plug holder



Chapter 3
Starting the System

This chapter explains how to start the system, how to change the output signal and how to adjust iris and focus.

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3-1-2 Turning the Power On/Off 3-3
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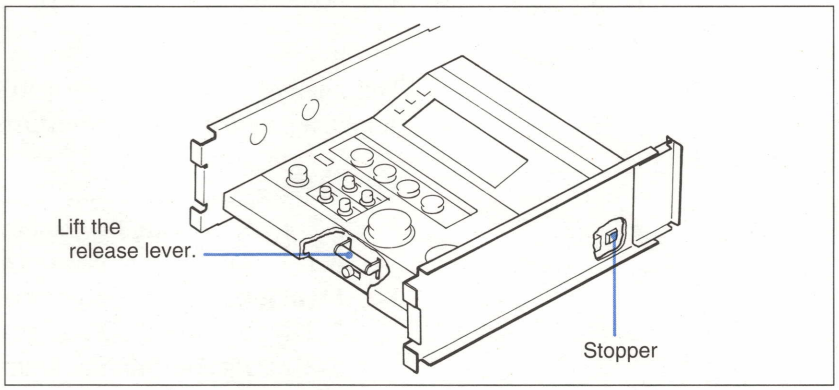
3-1 Starting

3-1-1 Removing the Panel

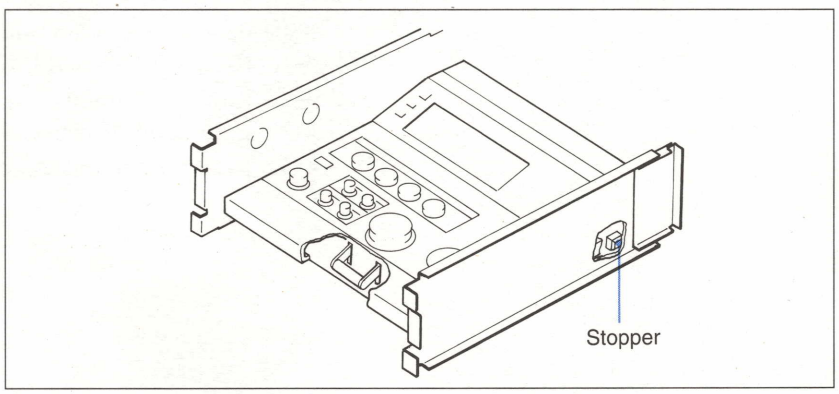
Removing the panel from the rack

Remove the panel from the rack as follows.
Lift the release lever and pull out the panel. (When the release lever is lifted, the stopper releases the panel lock.)



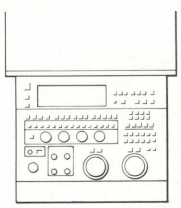
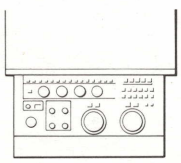
Removing the panel from the rack

Lower the release lever. The stopper protrudes when the panel reaches one of the three specified positions. The panel is locked.



Panel lock

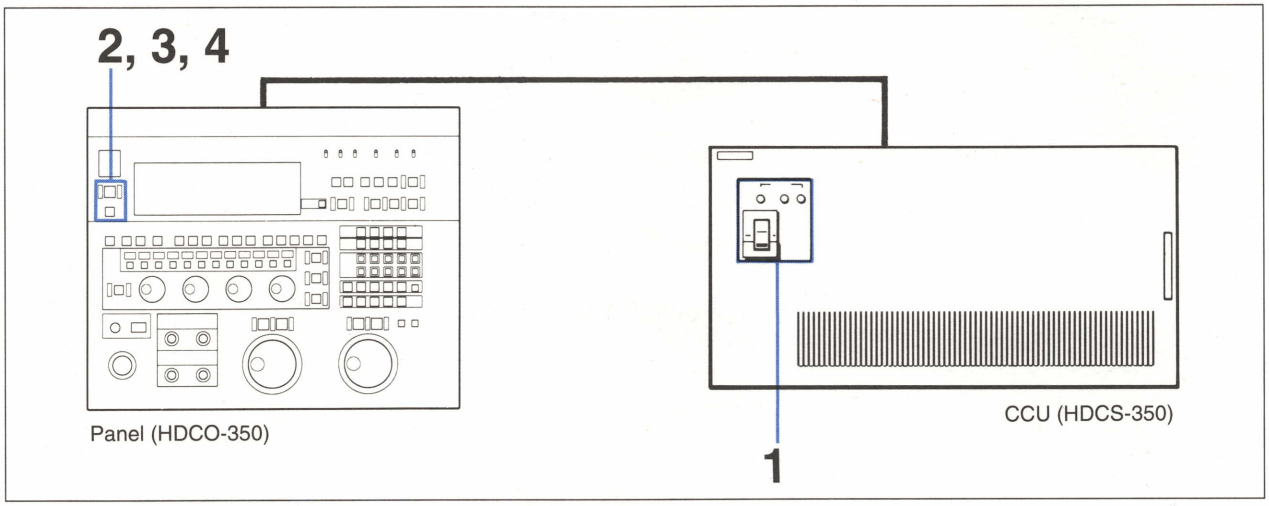
Select one of the following specified position according to how you are using the system.

To operate the panel entirely	To operate only the front part of the panel	To place the panel in the mounting rack
		

Three specified panel positions

3-1-2 Turning the Power On/Off

Turning on the power

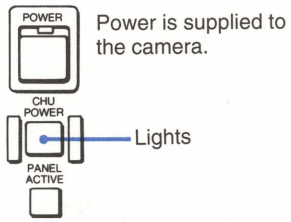
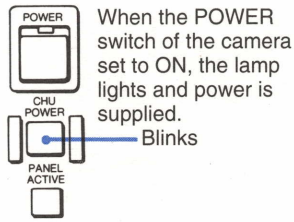


Turning on the power

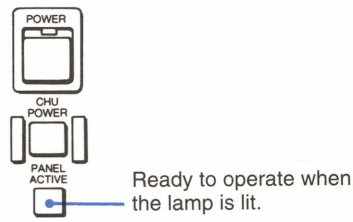
1 Set the POWER switch of CCU to ON.
The MAIN POWER lamp lights.

2 Press the POWER button of the panel.
The POWER lamp lights.

3 Press the CHU POWER button of the panel.

When the POWER switch of the camera is set to ON	When the POWER switch of the camera is set to OFF
 Power is supplied to the camera. Lights	 When the POWER switch of the camera is set to ON, the lamp lights and power is supplied. Blinks

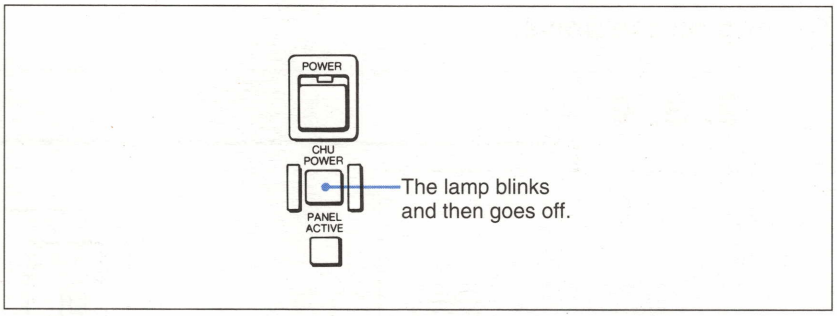
4 Wait until the PANEL ACTIVE button of the panel lights.



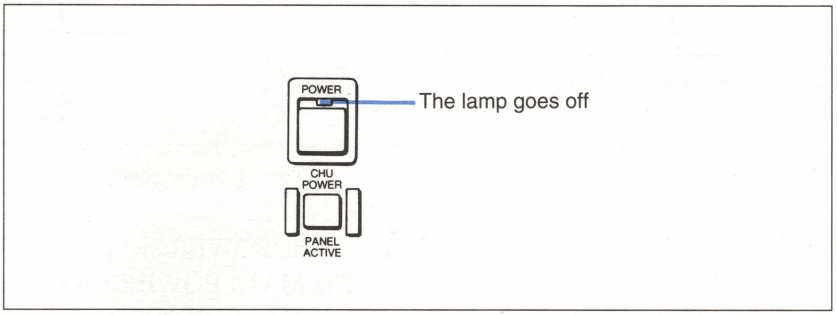
When the PANEL ACTIVE lamp is not lit, buttons other than the PICTURE MONITOR and WF MONITOR buttons do not operate.

Turning off the power

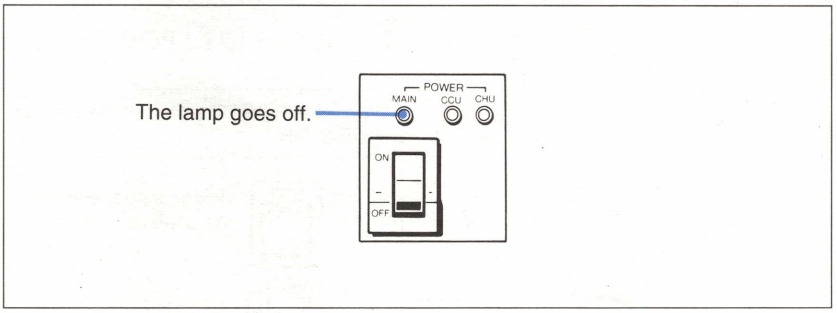
1 Press the CHU POWER switch of the panel.



2 Press the POWER switch of the panel.



3 Set the POWER switch of CCU to OFF.

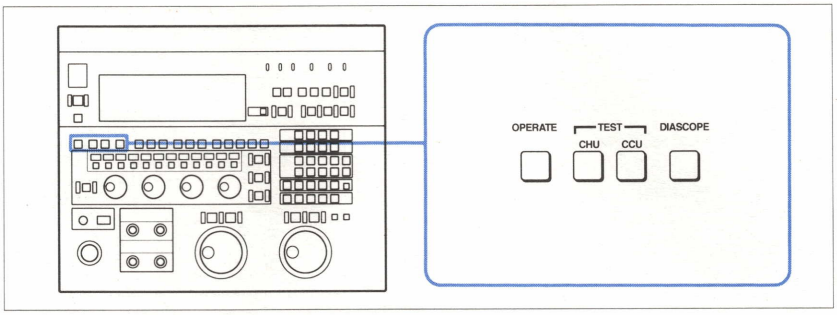


To turn off the camera while maintaining power to other components

Turn off the POWER switch of the camera.

3-2 Switching the Output Signal

3-2-1 Camera Output Signal



Switching the camera output

To select the camera output signal, press the selector such that the corresponding lamp lights.

OPERATE: Selects the camera screen signal

CHU: Selects the sawtooth waveform test signal generated by the camera

CCU: Selects the test signals[1)], such as color bars, generated by the CCU

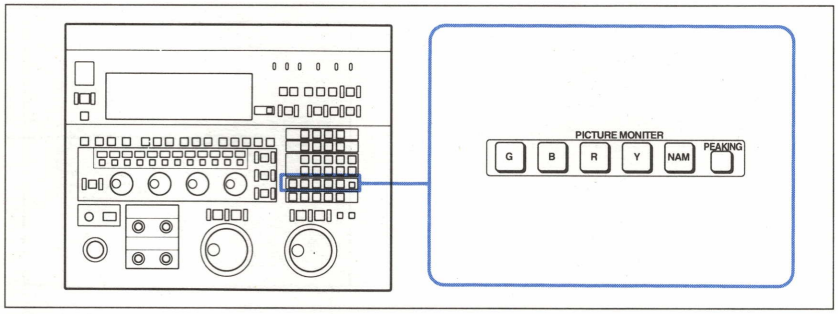
DIASCOPE: Selects the test pattern built into the lens to be used. You can use this button only when the test pattern is built into the camera.

When both the CHU and CCU lamps are lit

The panel outputs the test signals generated by the CCU (color bar, etc.)

1) All types of test signal can be output, instead of simple color bars, by changing the built-in switch of CCU.

3-2-2 Picture Monitor Output Signal

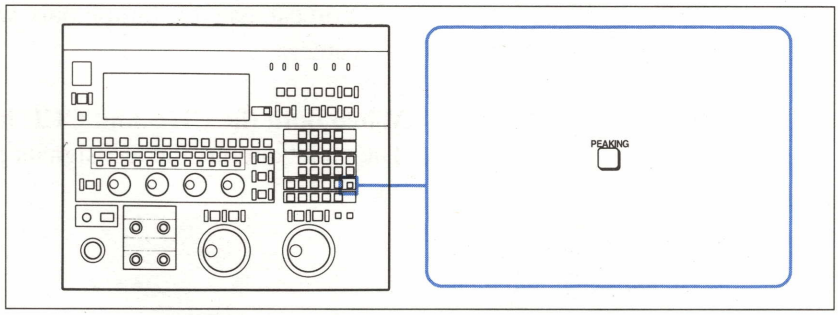


Switching the picture monitor screen

To select the picture monitor output signals, press the selector such that the corresponding lamp lights.

NAM[1]: Outputs the signal having the maximum value among the R, G, and B signals

Enhancing the contour of the picture monitor screen

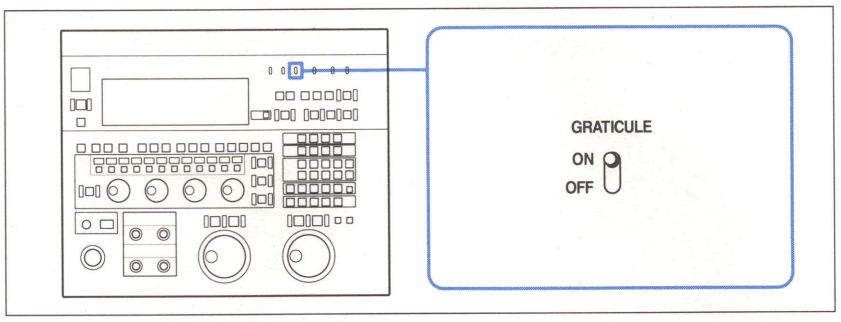


Enhancing the contour of the picture monitor screen

To enhance the contour of the picture monitor screen, press the PEAKING button to light the lamp.

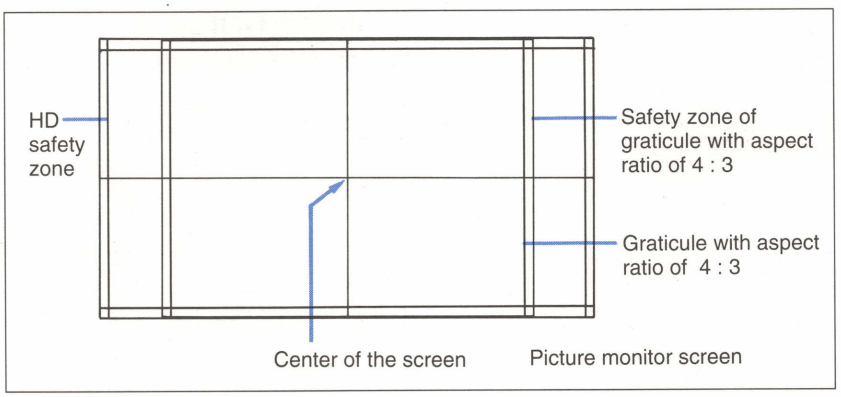
[1] **NAM:** Abbreviation for non additive mixing

Displaying the screen graticule on the picture monitor



Displaying the screen graticule on the picture monitor

To display the screen graticule on the picture monitor, set the GRATICULE switch to ON to light the lamp.

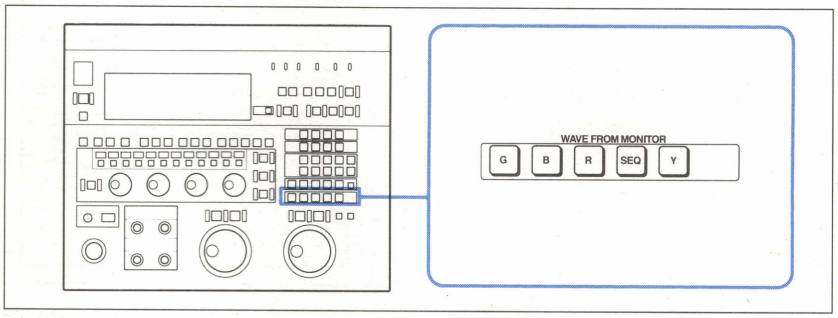

HD safety zone
Safety zone of graticule with aspect ratio of 4 : 3
Graticule with aspect ratio of 4 : 3
Center of the screen
Picture monitor screen

Screen graticule on the picture monitor

Note

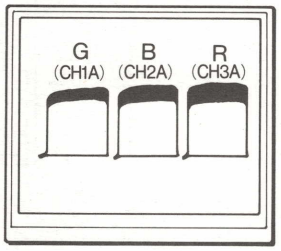
To display the safety zone (effective screen), you have to change the internal switch setting of CCU. For details, refer to the maintenance manual.

3-2-3 Waveform Monitor Output Signal



Selecting the waveform monitor signal

Press one or several of the buttons to light the corresponding indicators.
To display G, B and R signals simultaneously, press the SEQ[1] button.



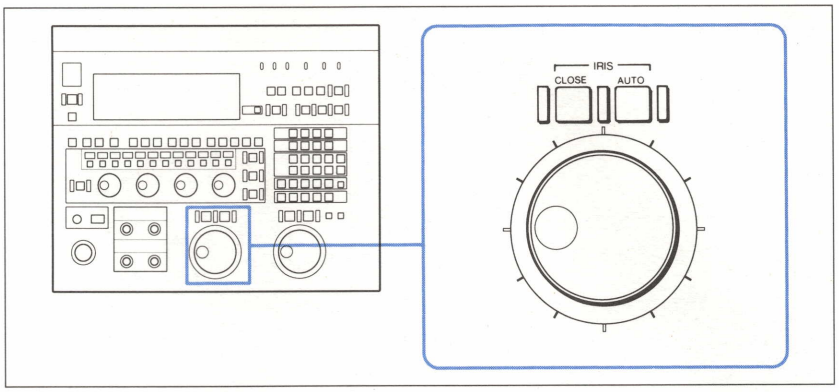
This displays the waveforms of the signals input to the Tektronix 1730HD waveform monitor's CH1A, CH2A and CH3A input connectors.

Sequential mode of the waveform monitor

Press two or all of G, B, and R switches simultaneously to monitor two or three waveforms together,
Press the Y switch to display Y/P_B/P_R.

[1] **SEQ:** Abbreviation for sequential

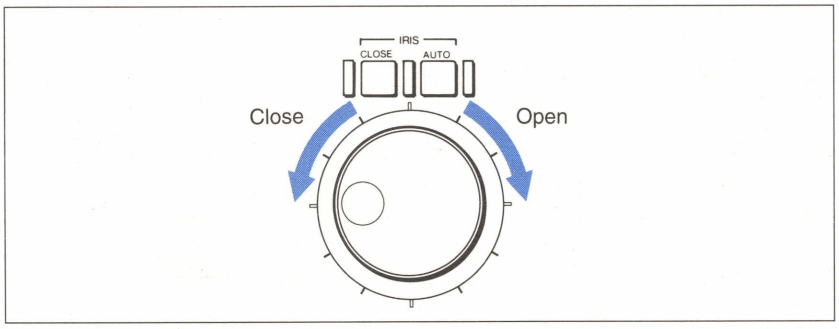
3-3 Iris Adjustment



Iris adjustment

Set the IRIS control mode of the lens to such a mode in which iris adjustment can be controlled from the camera. (AUTO/MANUAL → AUTO, SERVO/MANUAL → SERVO, etc.).

3-3-1 Manual Adjustment



Manual iris adjustment

Turn the dial to adjust the iris manually.

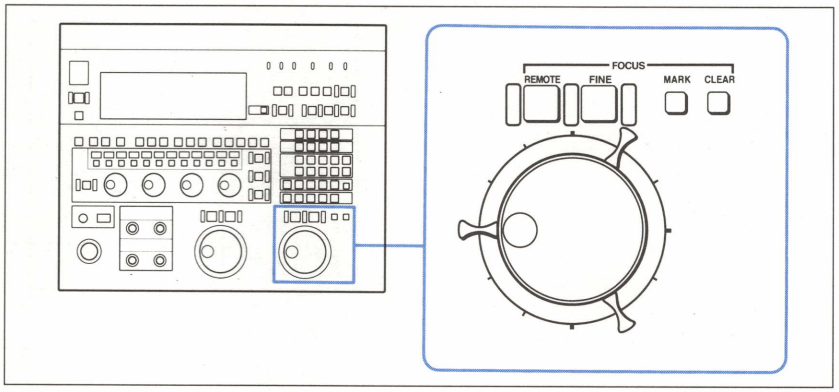
3-3-2 Automatic Adjustment

Press the AUTO button to light the indicator.
The iris is automatically set to the optimum value.
You can perform fine adjustment by turning the dial. (Range: automatically adjusted value ±1 iris)

3-3-3 Capping

Press the CLOSE button to light the indicator.
→ The iris is closed.
Press it again to reset the iris to the setting prior to closing. The lamp goes off. In manual adjustment mode, the iris is reset to the previously adjusted value.

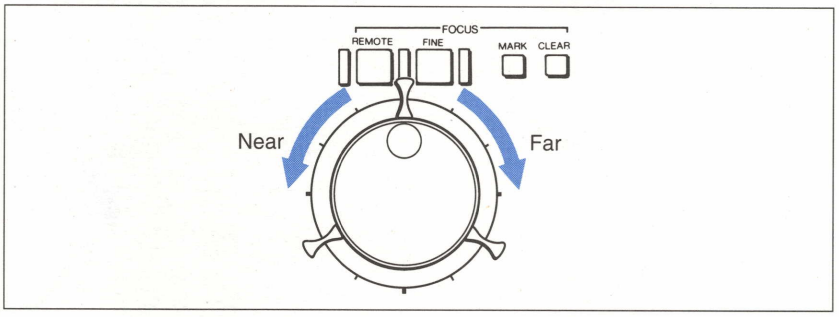
3-4 Focusing



Focus adjustment

Set the focus mode change switch on the lens to "external adjustment".

3-4-1 Rough Adjustment



Rough adjustment of focus

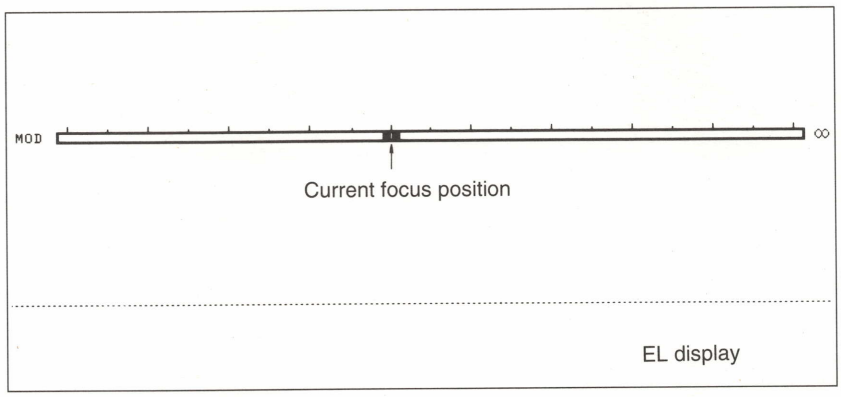
Press the REMOTE button to light the indicator. Turn the dial to make the adjustment.

3-4-2 Fine Adjustment

Press the FINE button to light the lamp while the REMOTE lamp is lit. Turn the dial to make the fine adjustment.

3-4-3 Indicating the Focus Position

When the lens features a communication function for the focus position (distance ring position), the following indications are displayed.

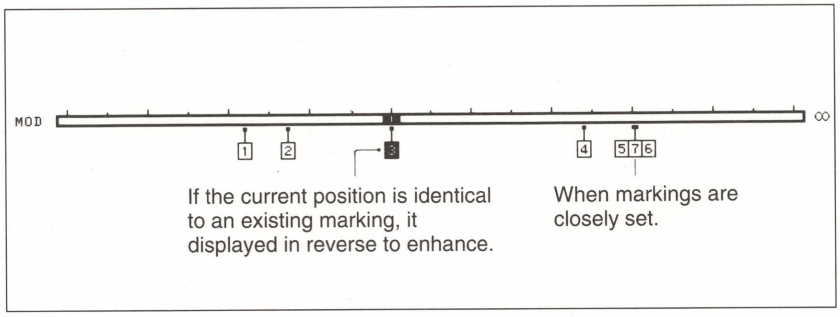


Focus position display

These indications also appear when focusing on the camera.

3-4-4 Marking the Distance Ring Position

Every time the MARK button is pressed, up to 35 marks are set (1,2.3,....9, A,B,C,...Z).
Press the CLEAR button to delete all markings.



Marking the focus position

[1] **MOD:** Abbreviation for Minimum Object Distance

Chapter 4 Setting Up

This chapter explains settings and adjustments that must be made prior to recording.

4-1 Control Data Switches 4-2
4-2 Set-Up Item List 4-3
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4-2-2 Automatic Adjustment Items 4-3
4-2-3 Manual Adjustment Items 4-3
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4-3-3 Setting the Gamma ON/OFF 4-5
4-3-4 Setting the Auto-Knee ON/OFF 4-6
4-4 Automatic Setting Up 4-7
4-5 Automatic Adjustment 4-9
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4-6-1 Basic Operation 4-10
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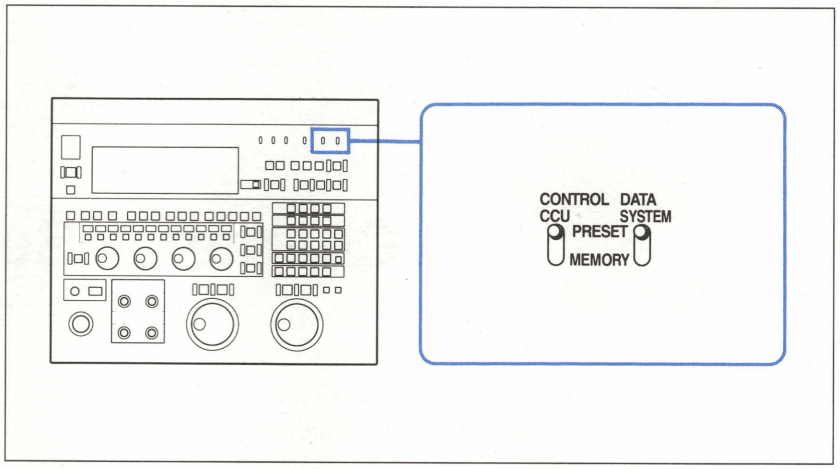
4-1 Control Data Switches



Control data switches

Set the switch to MEMORY to adjust the screen level on the panel. Set the switch to PRESET to carry out standard state settings using the internal adjustment controls of the CCU or camera.

PRESET	The screen level is determined by adjusting on the CCU or the camera. Correction assumes the control range center.
MEMORY	The screen level takes the value corrected by the memory-retained data.

CCU	Adjusts only the items on the CCU among the screen level adjustment items.
SYSTEM	Adjusts all screen level items.

4-2 Set-Up Item List

This section shows the setup item list.

4-2-1 Basic Setting Items

Adjustment item	Refer page
ND/CC filter	4-4
Master gain	4-5
Master ON/OFF	4-5
Auto-knee ON/OFF	4-6

4-2-2 Automatic Adjustment Items

Adjustment item	Refer page
Auto setup	4-7
Auto white balance	4-9
Auto black balance	
Auto delay	

4-2-2 Manual Adjustment Items

Adjustment dials

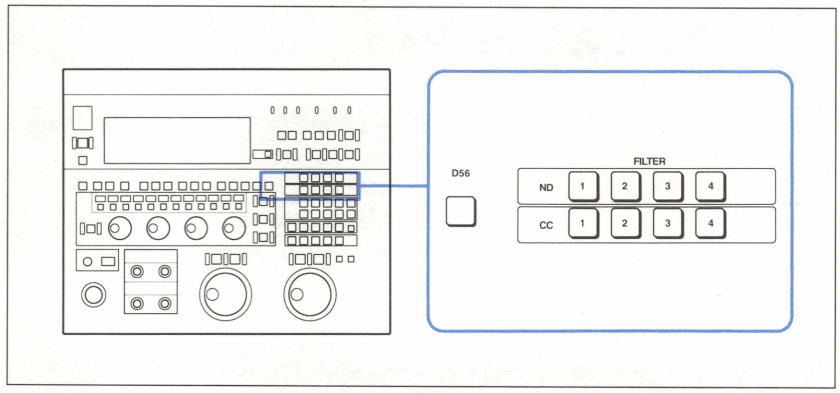
Adjustment item	Parameter				Refer pages
Black balance/White balance	B BLK	R BLK	B WHT	R WHT	4-12/4-17
Flare	G FLARE	B FLARE	R FLARE	—	4-20
D-IE 1 (Contour 1)	DETAIL GAIN	THRESHOLD	CRISP	FREQUENCY	4-22
Contrast	M GAMMA	KNEE	SLOPE	BLACK GAMMA	4-24
Gamma	M GAMMA	B GAMMA	R GAMMA	BLACK GAMMA	4-29
D-IE 2 (Contour 2)	LIMIT LEVEL	LIMIT CURVE	V RATIO	SOURCE	4-30
White shading/G white level	G WHT SHADING	B WHT SHADING	R WHT SHADING	G WHITE	4-32/4-17
Lens	—	F-NO MAX	F-NO MIN	LENS TYPE	5-7
Shutter/Super EVS	SHUTTER SPEED	CLS	EVS	—	4-34

Control operation

Adjustment item	Refer page
Black balance/White balance	4-37
Master black	4-38

4-3 Basic Setting Up

4-3-1 Setting the ND/CC Filter



Setting the filter

Press one button of the ND and CC button groups to light the corresponding lamps.

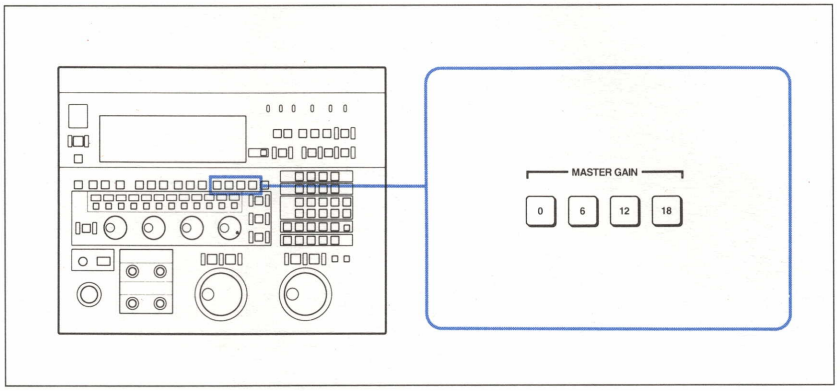
ND[1]		
1	CLEAR	Completely transparent
2	1/4 ND	NDfilter to reduce lighting to 1/4
3	1/8 ND	ND filter to reduce lighting to 1/8
4	1/16 ND	ND filter to reduce lighting to 1/16

CC[2]		
A	3200 K	Press this button when the color temperature of the lamp is 3200 K.
B	4300 K	Press this button when the color temperature of the lamp is 4300 K.
C	6300 K	Press this button when the color temperature of the lamp is 6300 K.
D	EFFECT	Cross filter for special effect

When the color temperature is 5600K, press the D 56 button to light the lamp. The color balance is obtained.

[1] **ND:** Abbreviation for neutral density
[2] **CC:** Abbreviation for color compensation

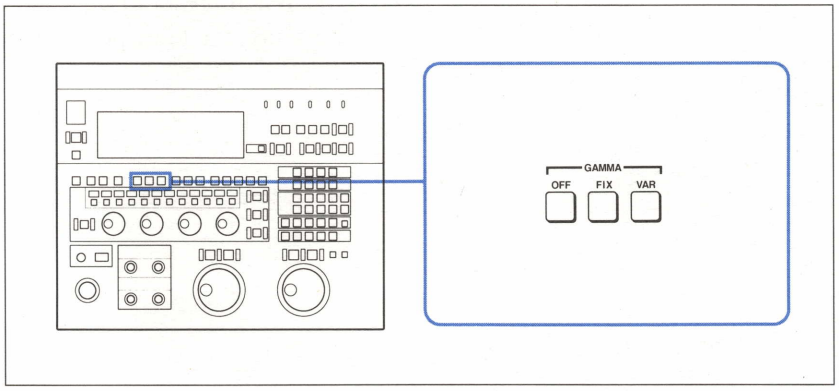
4-3-2 Setting the Master Gain



Setting the master gain

Press one of the MASTER GAIN buttons to light the corresponding lamp.

4-3-3 Setting the Gamma ON/OFF

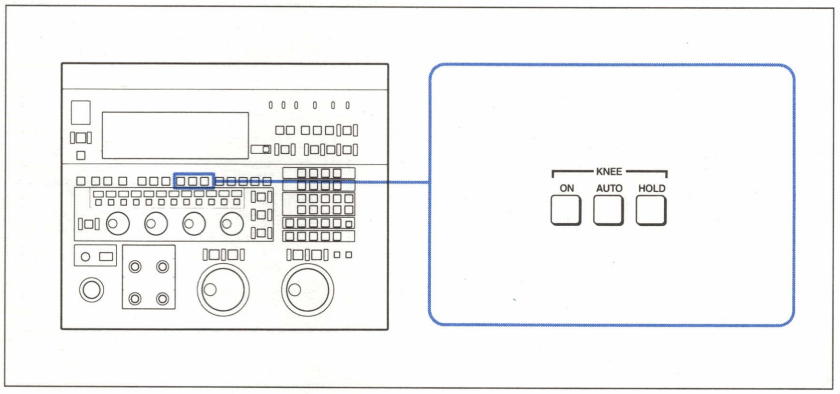


Setting the gamma

Press one of the following buttons to light the corresponding lamp.
OFF: No gamma correction
FIX: Corrects the gamma ($\gamma = 0.45$)
VAR[1]**:** Corrects the gamma. The value is adjusted by turning the dial.

[1] **VAR:** Abbreviation for variable

4-3-4 Setting the Auto-Knee ON/OFF



Setting the knee point

Press one of the following buttons to light the corresponding lamp.

ON: Operates knee.

When AUTO is lit: The knee point is automatically adjusted by detecting the lighting of the subject.

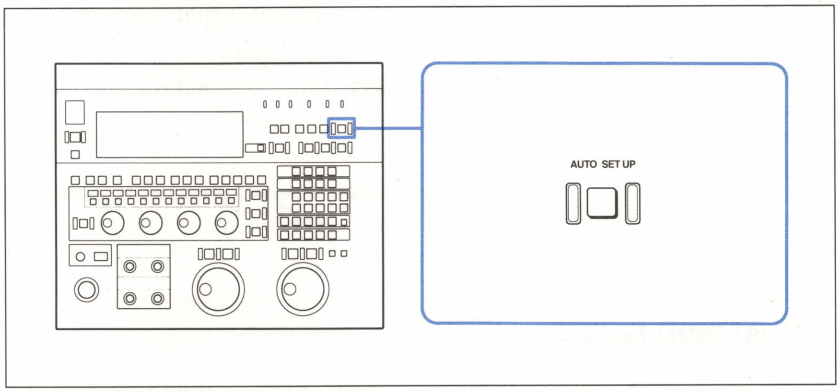
When AUTO is not lit: The knee point is adjusted by rotating the dial.

HOLD: When preset to light the HOLD lamp while KNEE AUTO is operating, the knee point at that moment is held.

4-4 Automatic Setting Up

Auto setup is an adjustment whereby the hardware of the camera is automatically adjusted so that the correct reference values for black level/white level/gamma/flare balance are output when shooting a subject under normal conditions. (Of course, shooting is performed under various conditions. Thus, the values are adjusted so that the output signal of the subject under standard conditions is output as a reference level. By using this auto setup adjustment, the unit can compensate for variations within the camera hardware.)
The main purpose of the auto setup is to overcome hardware variations caused by secular change or sudden changes in the immediate environment.
Thus, perform auto setup in the following cases. You can perform auto setup in other situations, also.

- When using the system for the first time
- When you do not use the system for a long period after turning off the power
- When the immediate environment suddenly chages.

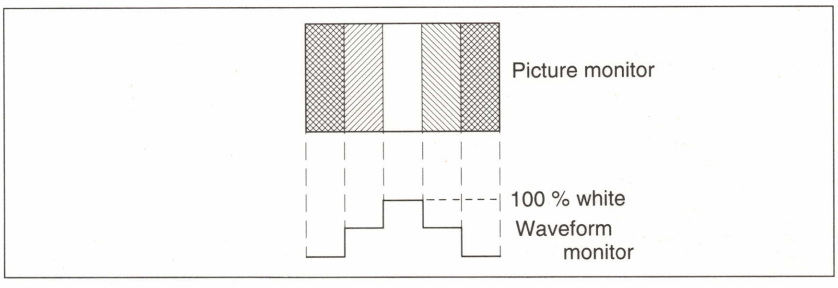


Auto setup section

AUTO SET UP: Auto setup for screen level.

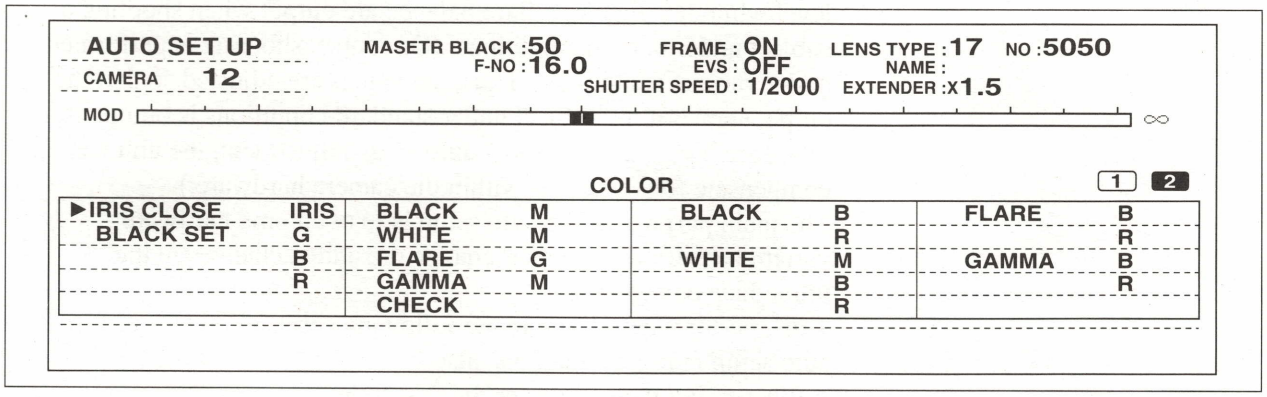
Operation

Press the AUTO SET UP button to light the indicator.
Auto setup operation is started.
The following test signal appears and auto setup is carried out according to this test signal when you press the AUTO SET UP button.



Test signal waveform at auto setup

Display during adjustment



Display during auto setup

▶ : During adjustment
During adjustment, the buttons on the panel do not function.

1 : Indicates that the first auto setup (rough adjustment) has been executed.

2 : Indicates that the second auto setup (fine adjustment) has been executed.

When adjustment is completed, the AUTO SET UP button lamp goes off.

Adjustment failure

When adjustment ends in failure, the AUTO SET UP button lamp blinks.

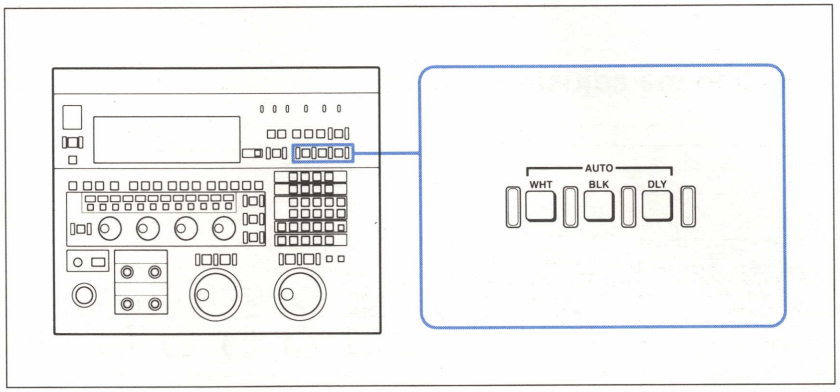
To perform auto setup again, proceed as follows.

1 Press the AUTO SET UP button to stop the lamp blinking.
The buttons on the panel become active.

2 Press the AUTO SETUP button to activate auto setup again.

4-5 Automatic Adjustment

White balance, black balance and skew caused by cable transmission can be automatically adjusted without using the HD chart.



Auto setup section

Press one of the following buttons to light the corresponding indicator. Once adjustment has been completed, the indicator goes off.

WHT: White balance

Adjusts the white balance according to the high luminance portion of the screen.

BLK: Black balance

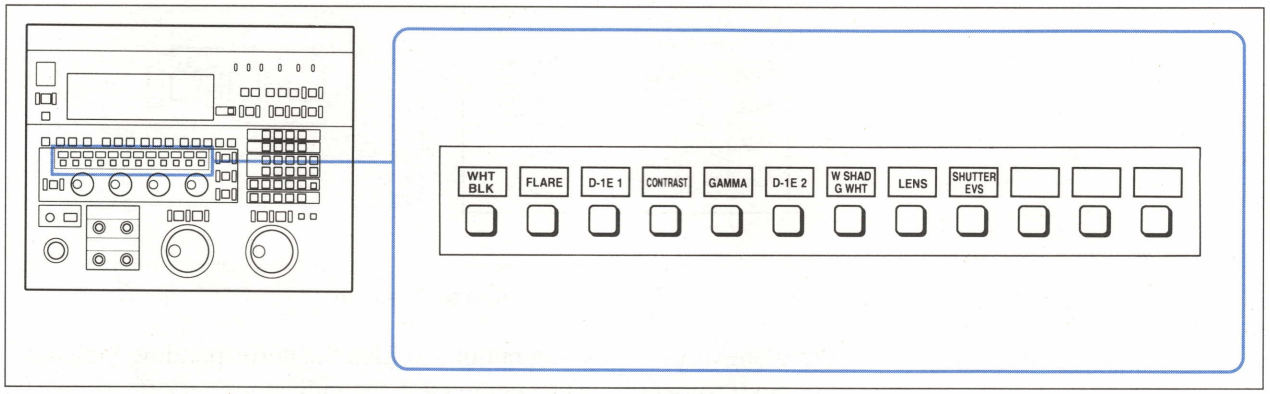
Automatically closes the iris during adjustment

DLY: Automatically adjusts the skew caused by cable transmission

4-6 Manual Setting Up

4-6-1 Basic Operation

Selecting the adjustment item

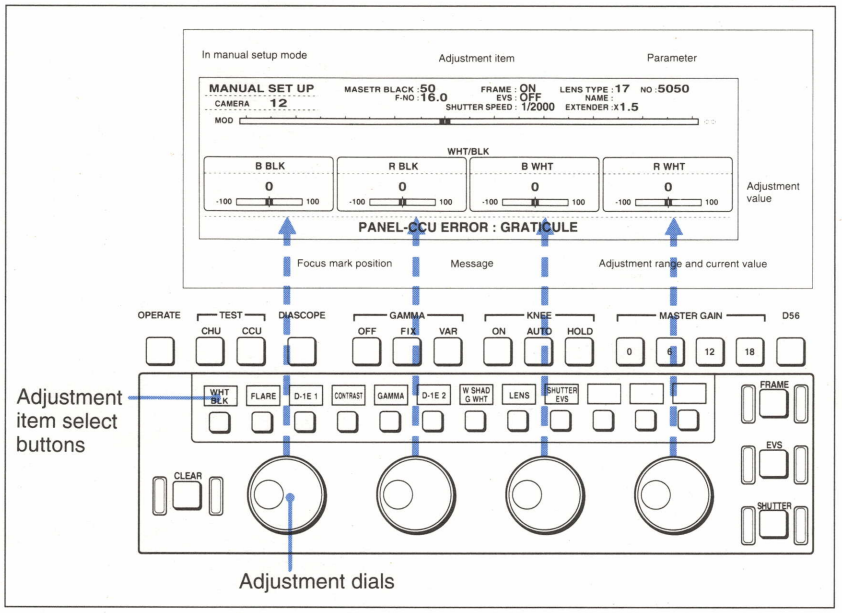


Manual adjustment section

Press the adjustment item select button corresponding to your desired adjustment item to light the lamp.

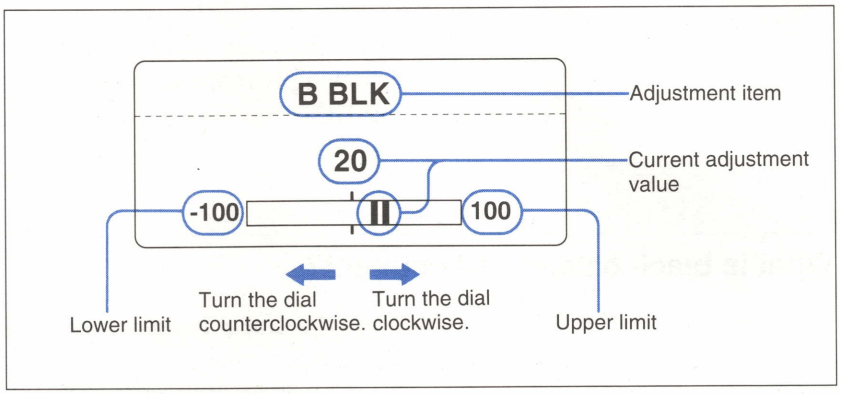
Adjustment

Press the desired adjustment item select button to light the corresponding indicator. Turn the corresponding adjustment dial to make adjustment.



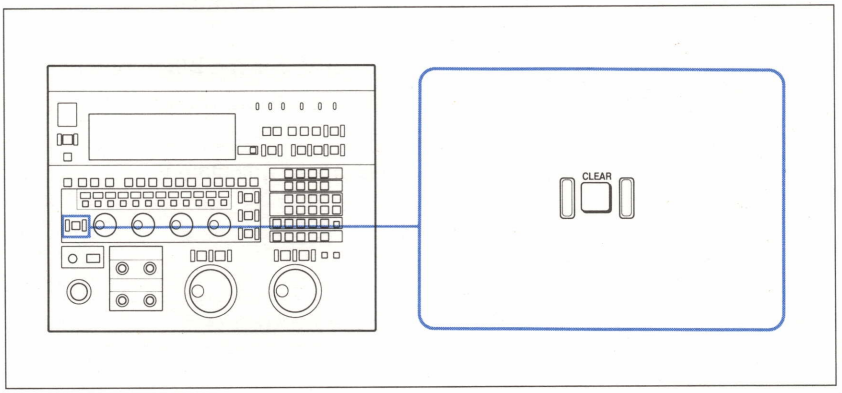
Basic operation of the manual adjustment

Display during adjustment



Display at manual adjustment

Erasing the adjusted value



Erasing the manually-adjusted value

Press the CLEAR button, then press the corresponding adjustment item select button.
The selected item's adjusted value is erased, and the system is reset to the AUTO SETUP, automatic adjustment or power ON state.

4-6-2 Manual Adjustment of Black Balance REF/SET UP/SCENE FILE

This subsection explains how to adjust the black balance using the following two parameters.

- B BLK
- R BLK

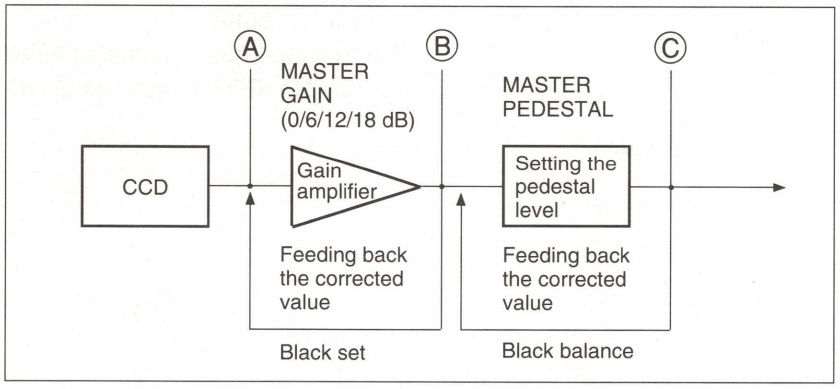
What is black balance adjustment?

This adjustment is carried out to such that the color of a black subject appears natural.
If the black level of each of the G,B, and R channels is not the same, a black object , or one with a largely black part becomes reddish or bluish.
Black balance adjustment failure is caused by the failure of the DC-restoring circuitry of the camera, due mainly to a secular change or temperature change.

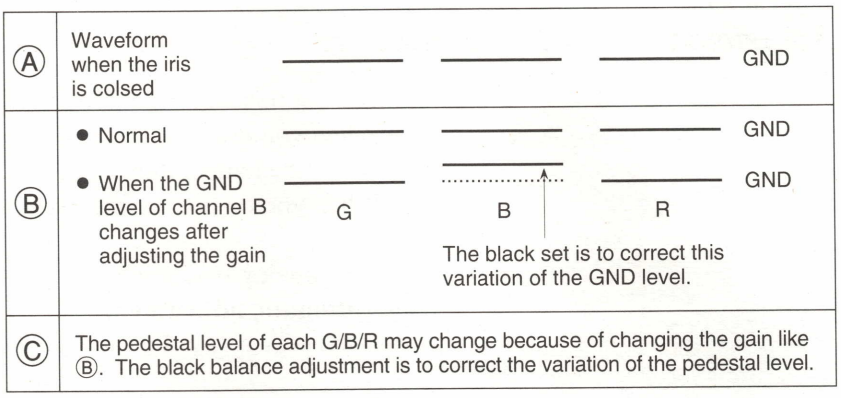
Actually, for the black balance, there are two manners; automatic adjustment and manual adjustment as follows.

Automatic adjustment	The black balance is automatically adjusted after the black set is adjusted so that the pedestal level of each of GBR channel will not vary even if the master gain is changed.
Manual adjustment	Only the black balance is adjusted.

Outline of the black set/black balance adjustment



General diagram of the black set/black balance adjustment


Ⓐ
Waveform when the iris is colsed
GND
Ⓑ
● Normal
GND
● When the GND level of channel B changes after adjusting the gain
GND
G
B
R
The black set is to correct this variation of the GND level.
Ⓒ
The pedestal level of each G/B/R may change because of changing the gain like Ⓑ. The black balance adjustment is to correct the variation of the pedestal level.

General diagram of the black set/black balance adjustment

Black set

Normally, the CCD output of each channel of G, B and R is GND (0 V) when the iris is closed like Ⓐ. However, when the master gain is changed (amplified), the level of a channel may change like Ⓑ in the figure. The black set is the adjustment to correct the variation of the GND level of each channel of R/G/B. Namely, this is the compensation of the level variation in the step prior to applying the pedestal level.

Black balance adjustment

The black balance adjustment is the adjustment to correct the variation of the pedestal level of each channel of G/B/R (Ⓒ in the figure). Namely, this is the correction of the level variation after applying the pedestal level.

Adjustment methods and purpose

Carry out this adjustment in the following cases.
- When you use the camera for the first time
- When the temperature changes suddenly
- When you do not use the camera for a long period

The following two adjustment methods are available.
- **Automatic adjustment**

For details, see "4-5 Automatic Adjustment".

- **Manual adjustment**

Use this method when you want to adjust the level as you desire.
It is recommended that you carry out the adjustment at rehearsal and store the adjusted value to a file. You can then call up the same conditions at the actual shooting.
– To reset an automatically adjusted value to a manually set reference value
  Store the adjusted value to a reference file.
– To carry out adjustment according to the environment or lighting conditions of the studio or location.
  Store the adjusted values to a setup file.
– To add coloring for special effects
  You can deliberately set the black balance adjustment off with the intention of adding special effects such that the object will become blackish, reddish or bluish.
  Store the adjusted value to a scene file.
– To make a fine adjustment during recording or broadcasting
  If automatic adjustment is carried out during recording or broadcasting, the iris is closed automatically. Thus, when the black balance is not adjusted during recording or broadcasting, correct manually with the fine adjustment control.

Adjustment

1 Prepare for adjustment.

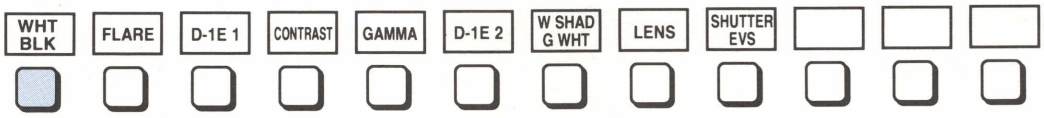
- **When adjusting the black balance**

Iris	Close completely
Master gain	Set the master gain according to the actual shooting conditions.
Measuring instrument	Waveform monitor

- **When coloring**

Measuring instrument	Video monitor

2 Select the adjustment item.
By pressing the WHT/BLK button, parameters appear on the display.
Make adjustments with the adjustment dial.



Items	B BLK (Black level of B)	R BLK (Black level of R)	◇ B WHT ◇ [1] (White level of B)	◇ R WHT ◇ (White level of R)
Adjustable range	–100 to 100	–100 to 100	–100 to 100	–100 to 100
Adjustment dial	Small Large	Small Large		

[1] **Items indicated with "◇ ◇"**
Items indicated with "◇ ◇" can be stored in the lens file.
For details, see "Lens file operation" in page 5-5.

3 Make the adjustment.

- **When adjusting the black balance**

Adjustment point	Pedestal level
Adjustment value	Adjust such that the pedestal level of each G/B/R channel is set to the certain level.

- **When coloring**

Adjustment point	Point to be colored
Adjustment value	Adjust to obtain the desired color tone.

4-6-3 Manual Adjustment of White Balance LENS/SCENE FILE

This subsection explains how to adjust the white balance using the following three parameters.

- B WHT
- R WHT
- G WHT

What is white balance?

White balance is the adjustment necessary to reproduce a picture in its natural colors. Differences in the relative output level of each channel are caused by differences in the color temperature of the light source, spectral response of the CCD and PRISM.

When the relative level of each RGB channel is different, a white subject will not be reproduced in white. Instead, a white subject will appear reddish or bluish. This may be because the gain of the camera's amplification system has not been adjusted.

Adjustment methods and purpose

Adjust the white balance under the same lighting conditions (the same light source) as the actual shooting. Readjust the white balance whenever the lighting condition (light source) changes.

The following two adjustment methods are available.

- **Automatic adjustment**

For details, see "4-5 Automatic Adjustment".

- **Manual adjustment**

Use this method when you want to set the level as you desire. It is recommended that you can carry out the adjustment at rehearsal and store the adjusted value to a file. You can then call up the same conditions at the actual shooting.

– To register a specially adjusted value for a certain lens
When using a lens with the communication function, the white balance is automatically adjusted when that lens is fitted to the camera.
When using a lens without the communication function, the white balance can be automatically adjusted by pressing the button.
Store the set values to the lens file.

– To carry out adjustment according to the shooting environment and lighting condition at a studio or location.
Store the set values to the setup file.

– To add coloring for special effects
You can deliberately set the white adjustment off with the intention of adding special effects. A white object can be made to appear blackish, reddish or bluish. Or, the skin tones can be made warm or cool. You can obtain an effect approximating to sunset, should you wish to shoot a sunset scene during the day.
Store the set values to the scene file.
– To make fine adjustments during recording or broadcasting
When the white balance is not adjusted during recording or broadcasting, correct it manually with the fine adjustment.

Adjustment

1 Prepare for adjustment.

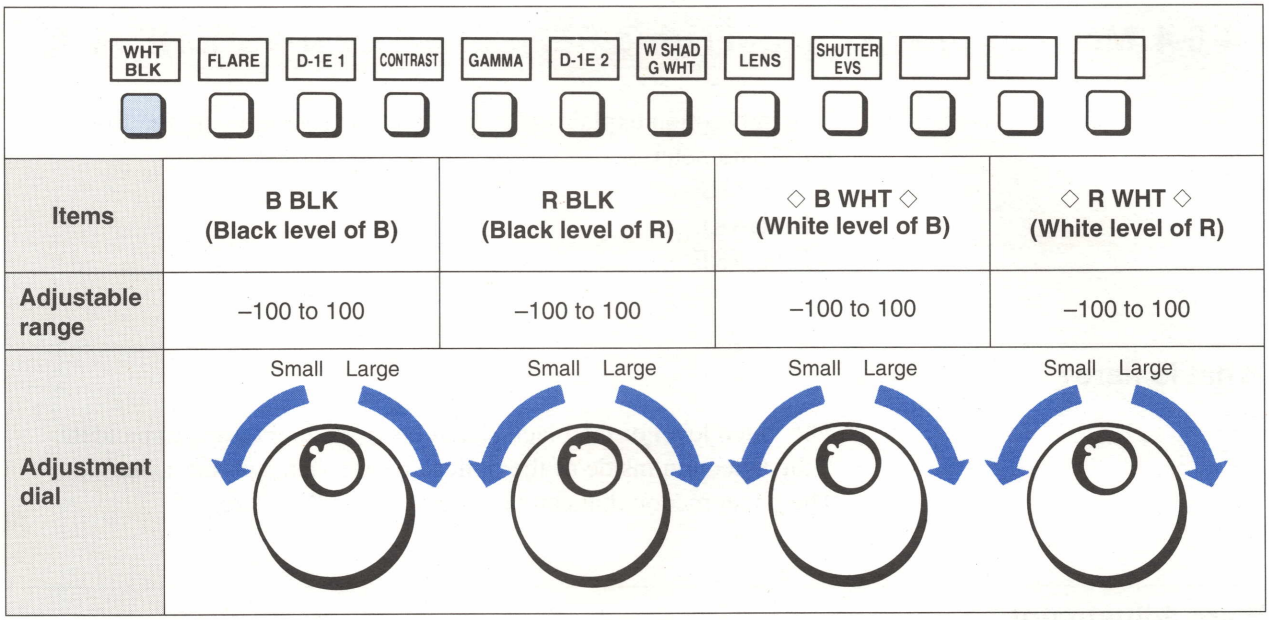
• When adjusting the white balance

Subject	White subject (or gray scale)
Light source (light condition)	Use the same light source as that for the actual shooting.
OPERATE/CCU/TEST button	Press the OPERATE button to light the lamp.
Filter	Set according to the color temperature of the light source.
Master gain	Set the master gain according to your actual shooting conditions.
Measuring instrument	Waveform monitor

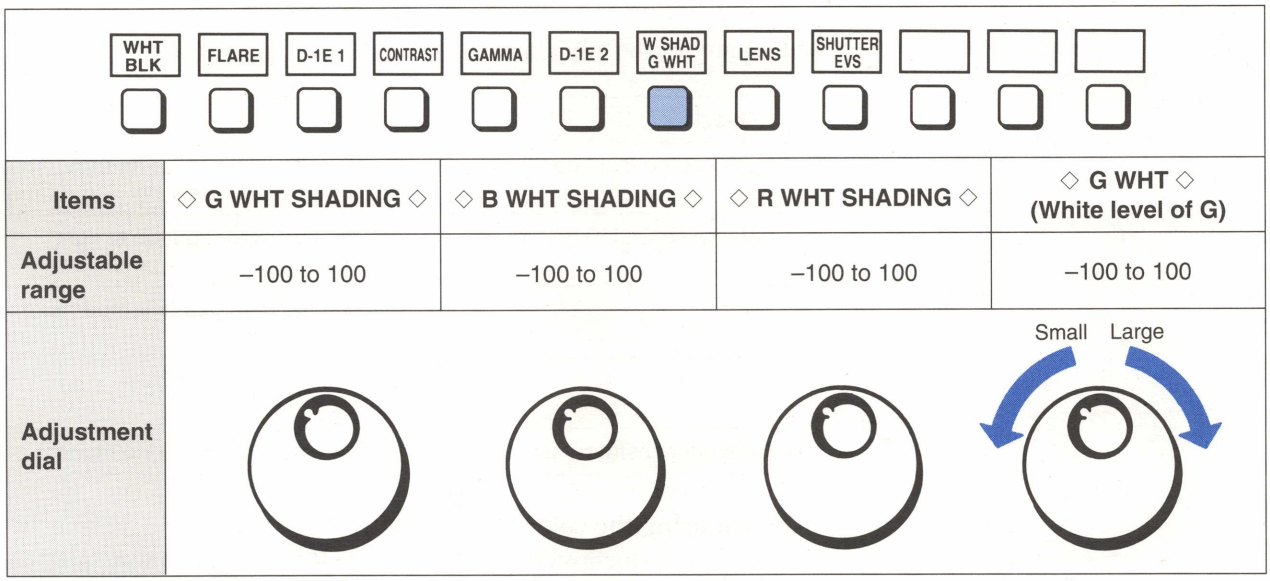
• When coloring

Measuring instrument	Video monitor

2 Select the adjustment item.
By pressing the WHT/BLK button, parameters appear on the display. To adjust G WHT (white level of G), press the W SHAD/G WHT button.
Make the adjustment with the adjustment dial.



Items	B BLK (Black level of B)	R BLK (Black level of R)	◇ B WHT ◇ (White level of B)	◇ R WHT ◇ (White level of R)
Adjustable range	–100 to 100	–100 to 100	–100 to 100	–100 to 100
Adjustment dial	Small Large	Small Large	Small Large	Small Large



Items	◇ G WHT SHADING ◇	◇ B WHT SHADING ◇	◇ R WHT SHADING ◇	◇ G WHT ◇ (White level of G)
Adjustable range	–100 to 100	–100 to 100	–100 to 100	–100 to 100
Adjustment dial				Small Large

3 Make the adjustment.

- **When adjusting the white balance**

Adjustment point	White peak level
Adjustment value	Make the adjustment so that the white peak level of each G/B/R channel is set to the certain level.

- **When coloring**

Adjustment point	Point to be colored
Adjustment value	Make the adjustment to obtain the desired color tone.

4-6-4 Manual Adjustment of Flaring REF/LENS/SET UP/SCENE FILE

This subsection explains how to adjust the flaring using the following three parameters.

- G FLARE
- B FLARE
- R FLARE

What is flare?

The video level of the black signal becomes higher due to incident light reflection inside of the optical system (lens, prism, I. sensor). The phenomenon that can be observed is called flare.

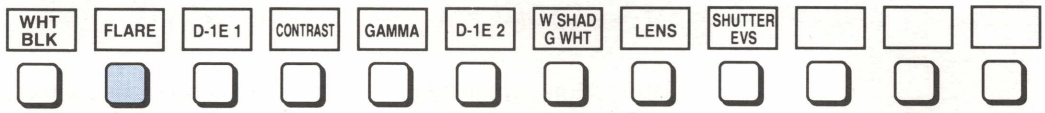
Flare adjustment

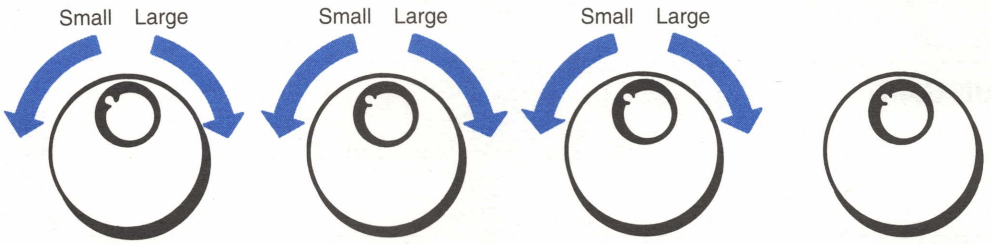
1 Prepare for the adjustment.

Subject	Gray scale
Light source (light condition)	Use the same light source as that used for the actual shooting.
OPERATE/CCU/TEST button	Press the OPERATE button to light the lamp.
Filter	Set according to the color temperature of the light source.
Iris	Adjust so that the video level becomes 100%.
Measuring instruments	Waveform monitor and video monitor

When using the color video monitor
Turn the monochrome switch on the video monitor as watching the black part of the reproduced image. If you notice the difference between monochrome and color condition, readjust the FLARE.

2 Select the adjustment item.
By pressing the FLARE button, parameters appear on the display. Perform adjustment using the adjustment dial.



Items	◇ G FLARE ◇ (Flare correction of G)	◇ B FLARE ◇ (Flare correction of B)	◇ R FLARE ◇ (Flare correction of R)	———
Adjustable range	–100 to 100	–100 to 100	–100 to 100	———
Adjustment dial				

3 Make the adjustment.

Adjustment point	Pedestal level
Adjustment value	• Adjust so that the overload of the pedestal level of each R,G, and B channel is the same when you open the iris. • When the adjusted value is 0, flare is not corrected. By turning the dial clockwise (+ direction), the regular flare correction is performed. By turning the dial counterclockwise (– direction), flare is added to the signal inversely.
Adjustment example	Adjust the value such that the overload of the black level becomes the same as when opening the iris by 1 scale or 2 scales.

4-6-5 Manual Adjustment of Contour - 1 SET UP/SCENE FILE

This subsection explains how to adjust the contour using the following four parameters.

- DETAIL GAIN
- THRESHOLD
- CRISP
- FREQUENCY

DETAIL GAIN

This parameter is used to set the contour enhancement amount.

THRESHOLD

This parameter is used to set the low brightness level that is subject to the contour correction.

CRISP

This parameter is used to cut the noise component of the detail signal.

FREQUENCY

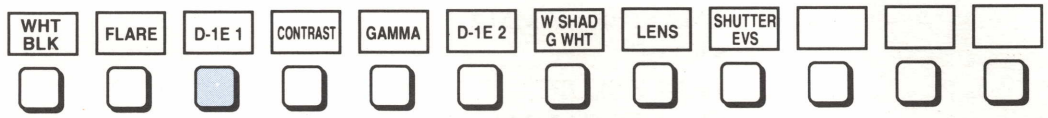
This parameter is used to enhance the contour of a certain frequency component in the 30-MHz or higher spectrum, included in the subject, by setting the frequency component which is subject to contour emphasis.

Manual adjustment of contour 1

1 Prepare for the adjustment.

Subject	Subject whose contour is to be adjusted
Light source (light condition)	Use the same light source as that of the actual shooting.
OPERATE/CCU/TEST button	Press the OPERATE button to light the lamp.
Filter	Set according to the color temperature of the light source.
Focus	Set the focus correctly.
Measuring instruments	Video monitor

2 Select the adjustment item.
By pressing the D-IE1 button, the parameter appears on the display. Perform the adjustment using the adjustment dial.



Items	**DETAIL GAIN** (Contour correction amount)	**THRESHOLD** (Changes the correction amount by screen brightness. The correction amount is adjustable.)	**CRISP** (Detects the minimum contour component. Any component less than the minimum is considered a noise and is not subject to contour correction.)	**FREQUENCY** (Thickness of contour correction in the horizontal direction.)
Adjustable range	0 to 64	0 to 7	0 to 16	0 to 8
Adjustment dial	Small Large	Small Large	Small Large	Small Large

3 Make the adjustment.

Adjustment point	Part whose contour is to be adjusted
Adjustment value	Adjust the value according to your preference.

4-6-6 Manual Adjustment of Contrast SET UP/SCENE FILE

This subsection explains how to adjust the contrast of the picture using the following four parameters.

- MASTER GAMMA
- KNEE
- KNEE SLOPE
- BLACK GAMMA

What is gamma adjustment?

This adjustment sets the luminous characteristics of the cathode ray tube of the monitor to match the luminous degree characteristics of human beings and to correct the characteristic difference of the picture elements. When the gamma is not adjusted (the setting of the gamma curve is not good), the medium tone white (gray) is colored. This also affects the reproduction of skin tones.
Also, to obtain special effects, the gamma curve may be changed according to the scene.

Explanation

The camera has particular characteristic that is called gamma (γ) characteristic. This characteristic reflects the relation between the light incident amount and the output signal. The camera has a circuit with a special gain to determine the quantity relation. This circuit is designed to correct the non-linearity of the input signal and luminous amount of R, G and B of the cathode ray tube of the monitor.
There are three electron guns in the monitor, corresponding to three CCDs of the camera. The relation between the video input signal and luminous amount is non-linear. This non-linearity causes no problems. But, it is a major consideration in the design of color televisions.
For example, to reproduce an orange whose percentage of the picture signal input value of R and G is 90% and 30% respectively, the luminous amount is the same ratio only when the relation between the video input value and the luminous amount is linear, and the same orange can be reproduced. However, the luminous ratio changes due to the gamma characteristics of the monitor. Hence a red hue is reproduced instead of orange.
The gamma value of household television in each family cannot be changed. Thus, the gamma characteristic of the camera should be set to the opposite characteristic to those of the monitor. The gamma characteristic of the monitor is 2.2, thus, the gamma characteristic of the camera will be set to 0.45.
The camera converts the luminous amount, according to the above characteristic, to produce a linear RGB output.

MASTER GAMMA

This parameter is used to change the gamma curve for each RGB signal at the same time.

BLACK GAMMA

This parameter is used to adjust the gamma around the black level.

What is knee adjustment?

This adjustment is performed to adjust the gradation of white. This adjustment is carried out by dropping the gain of the part over 100% of the picture, with a curve that resembles bending the knee, so that detail of the white part can be reproduced. If the slop is different among the R,G, and B channels, unnecessary color is added to the white part over 100% (the white part cannot be reproduced).

- You can shoot a white subject having very strong contrast, and successfully reproduce it.
- You can shoot a subject against the light or under bright lighting.

KNEE

This parameter is used to set the knee point (the luminance level for adding the knee slope).

SLOPE

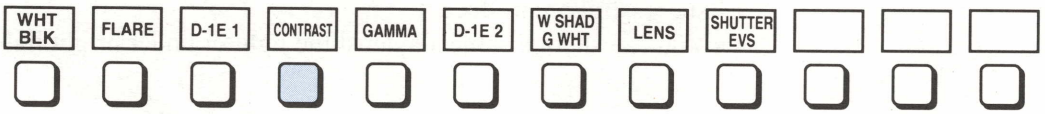
This parameter is used to set the knee slope.

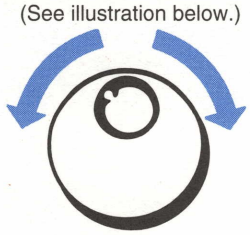
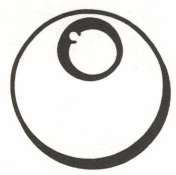
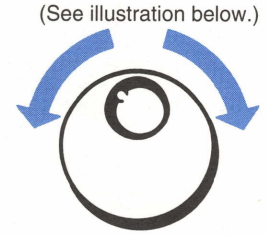
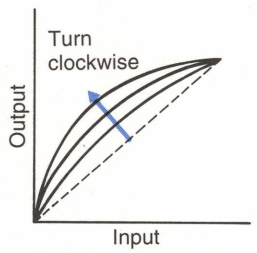
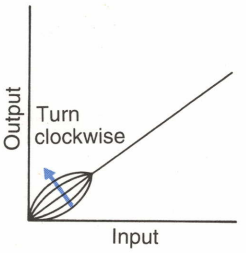
Manual adjustment of master gamma

1 Prepare for the adjustment.

Subject	Gray scale
Focus	Set the focus correctly.
Light source (light condition)	Use the same light source as that used for the actual shooting.
OPERATE/CCU/TEST button	Press the OPERATE button to light the lamp.
Filter	Set according to the color temperature of the light source.
Measuring instruments	Waveform monitor and video monitor

2 Select the adjustment item.
By pressing the CONTRAST button, parameters appear on the display. Perform the adjustments using the adjustment dial.



Items	**M GAMMA (Master gamma)** Adjustable when the VAR lamp of the GAMMA button is lit.	**KNEE (Knee point)** Adjustable when the KNEE ON lamp is lit.	**SLOPE (Slope)** Adjustable when any of the KNEE lamps is lit.	**BLACK GAMMA (Black gamma)** BLACK GAMMA is always adjustable irrespective of whether the GAMMA and KNEE lamps are lit or not.
Adjustable range	–100 to 100	–100 to 100	–100 to 100	–4 to 4
Adjustment dial	(See illustration below.) 			(See illustration below.) 
Explanation		—		

3 Make the adjustment.

Adjustment point	Center of the gray scale waveform
Adjustment value	Make adjustments using the center of the gray scale waveform (corresponding to the gray part of the gray scale chart). Adjust so that the center of the gray scale waveform comes to the center of the scale of the waveform monitor.

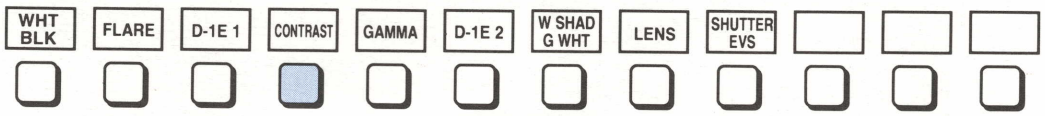
The standard gamma curve is linear. However, you can change the gamma curve to obtain special effects according to the scene.

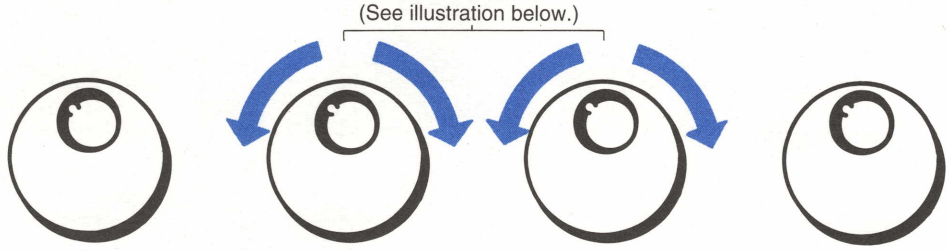
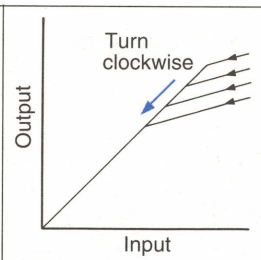
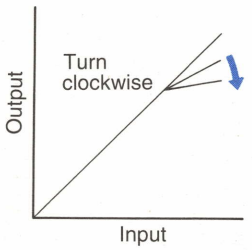
Manual knee adjustment

1 Prepare for the adjustment.

Subject	Subject to be adjusted or gray scale
Focus	Set the focus correctly.
Light source (light condition)	Use the same light source as that used for the actual shooting.
OPERATE/CCU/TEST button	Press the OPERATE button to light the lamp.
Filter	Set according to the color temperature of the light source.
Measuring instruments	Waveform monitor and video monitor

2 Select the adjustment item.
By pressing the CONTRAST button, the parameters appear on the display. Perform the adjustment using the adjustment dial.



Items	M GAMMA (Master gamma) Adjustable when the VAR lamp of the GAMMA button is lit.	KNEE (Knee point) Adjustable when the KNEE ON lamp is lit.	SLOPE (Slope) Adjustable when any of the KNEE lamps is lit.	BLACK GAMMA (Black gamma) BLACK GAMMA is always adjustable irrespective of whether the GAMMA and KNEE lamps are lit or not.
Adjustable range	–100 to 100	–100 to 100	–100 to 100	–4 to 4
Adjustment dial				
Explanation	——			——

3 Make the adjustment.

Adjustment point	Part to be adjusted or the part surrounding the maximum level of the gray scale waveform.
Adjustment value	Adjust as you desire.

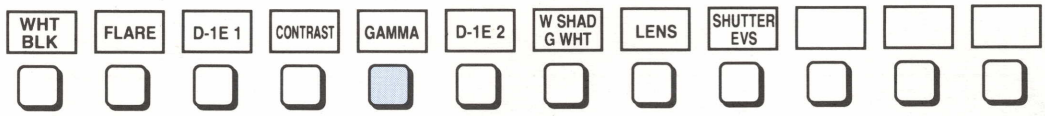
4-6-7 Manual Adjustment of Gamma SET UP/SCENE FILE

This subsection explains how to adjust gamma using the following four parameters.

- M GAMMA
- B GAMMA
- R GAMMA
- BLK GAMMA

In addition to M GAMMA/BLK GAMMA explained in "4-6-6 Manual Adjustment of the Contrast", you can adjust R GAMMA/B GAMMA as exaplained in this subsection.

The standard setting has the gamma curves of the R, G and B channels are the same. You should perform manual adjustment when the curves of the channels are not the same.
For details of this adjustment, see "4-6-6 Manual Adjustment of Contrast".



Items	M GAMMA (Master gamma)	B GAMMA (Gamma of B)	R GAMMA (Gamma of R)	BLACK GAMMA
	Adjustable only when the VAR lamp of the GAMMA button is lit.			
Adjustable range	–100 to 100	–100 to 100	–100 to 100	–4 to 4
Adjustment dial	(See illustration below.)			(See illustration below.)
Explanation	Turn clockwise; Output; Input			Output; Turn clockwise; Input

4-6-8 Manual Adjustment of Contour - 2 SET UP/SCENE FILE

This subsection explains how to adjust the contour of the picture using the following four parameters.

- LIMIT LEVEL
- LIMIT CURVE
- V RATIO
- SOURCE

LIMIT LEVEL

This parameter is used to set the upper limit of the contour enhancement.

LIMIT CURVE

This parameter is used to set the detail curve.

V RATIO

This parameter is used to change the ratio of vertical correction to horizontal correction of the detail amount.

SOURCE

This parameter is used to set source for extracting the contour component.
Generally, G signal is used as reference signal to extract the horizontal and vertical contour component. However, to reproduce pictures as you desire, you can select the reference signal from the following six signals.

- G + B + R
- G + B
- G + R
- G
- B
- R

Application example

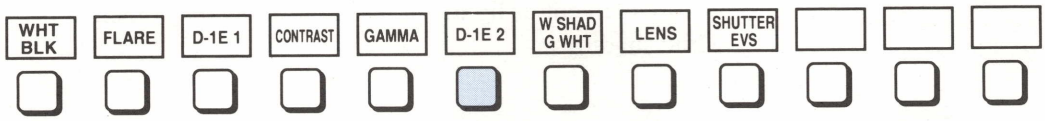
Even when the lighting changes to entirely red in a concert for example, the contour is still enhanced by selecting G + B + R.

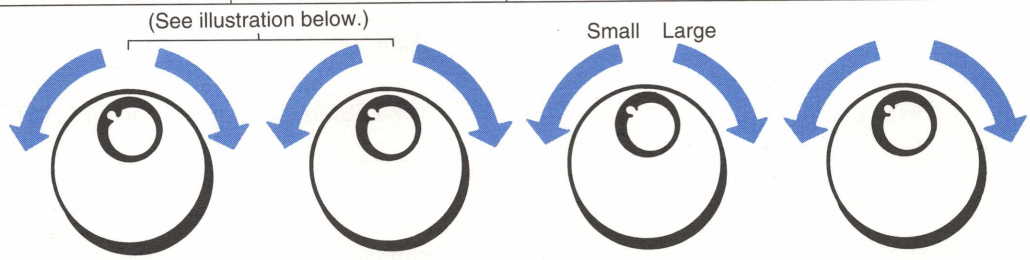
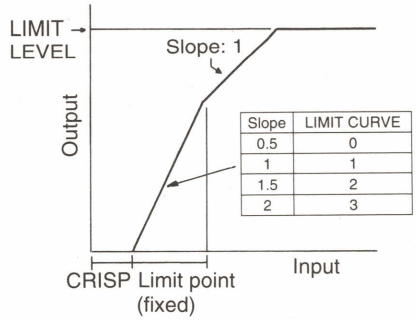
Manual adjustment of contour-2

1 Prepare for the adjustment.

Subject	Subject whose contour is to be adjusted
Focus	Set the focus correctly.
Light source (light condition)	Use the same light source as that used for the actual shooting.
OPERATE/CCU/TEST	Press the OPERATE button to light the lamp.
Filter	Set according to the color temperature of the light source.
Measuring instruments	Video monitor

2 Select the adjustment item.
By pressing the D-IE2 button, parameters appear on the display.
Perform the adjustment using the adjustment dial.



Items	LIMITED LEVEL (Upper limit after contour correction)	LIMIT CURVE (Shape number of contour correction)	V RATIO (Ratio of vertical correction to horizontal correction)	SOURCE (Original signal for extracting the contour component)
Adjustable range	8 to 127	0, 1, 2, 3	0 to 8 (same amount at 4)	Turn clockwise G, G+R, G+B, G+R+B, R, B
Adjustment dial				
Explanation				

Slope	LIMIT CURVE
0.5	0
1	1
1.5	2
2	3

3 Make the adjustment.

Adjustment point	Part whose contour is to be adjusted
Adjustment value	Adjust according to your taste.

4-6-9 Manual Adjustment of White Shading LINES/SET UP FILE

This subsection explains how to adjust the white shading using the following three parameters.

- G WHT SHADING
- B WHT SHADING
- R WHT SHADING

What is white shading?

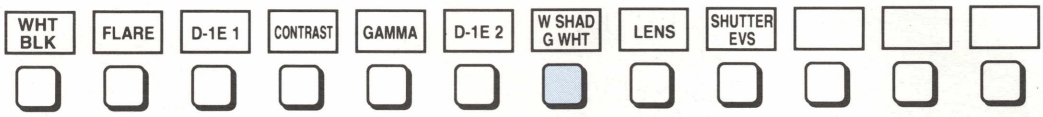
The level drops in every corner of an image in an optical system, or picture element or lighting condition. This phenomenon is called white shading.

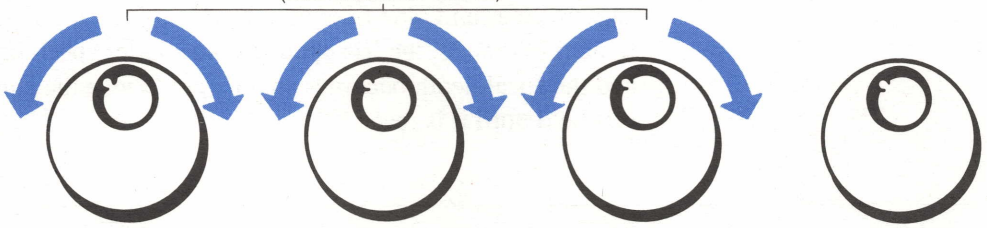
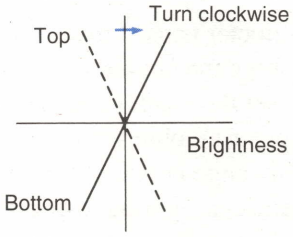
Manual adjustment of white shading

1 Prepare for the adjustment.

Subject	Subject to be adjusted or gray scale
Focus	Set the focus correctly.
Light source (light condition)	Use the same light source as that used for the actual shooting.
OPERATE/CCU/TEST button	Press the OPERATE button to light the lamp.
Filter	Set according to the color temperature of the light source.
Measuring instruments	Video monitor

2 Select the adjustment item.
By pressing the W SHAD/G WHT button, parameters appear on the display. Perform the adjustment using the adjustment dial.



Items	◇ G WHT SHADING ◇ (White shading correction of the G signal)	◇ B WHT SHADING ◇ (White shading correction of the B signal)	◇ R WHT SHADING ◇ (White shading correction of the R signal)	◇ G WHITE ◇ See page 4-17
Adjustable range	–100 to 100	–100 to 100	–100 to 100	———
Adjustment dial	(See illustration below.) 			
Explanation				———

3 Make the adjustment.

Adjustment point	Part to be adjusted
Adjustment value	Adjust so that white shading disappears.

4-6-10 Manual Adjustment of Shutter Speed/Super EVS SCENE FILE

This subsection explains how to adjust the shutter speed/Super EVS using the following three parameters.

- SHUTTER
- CLS [1)]
- Super EVS

SHUTTER

This parameter is used to set the fixed shutter speed.
You can select any desired shutter speed from 1/100, 1/125, 1/250, 1/350, 1/500, 1/1000 and 1/2000 seconds. This makes it possible to capture clear and blur-free pictures of subjects moving at high speeds. In auto iris mode, the iris opens as the shutter speed becomes slower and the focal depth becomes shallowere. Once the shutter speed is set, it is held until it is reset.

CLS

This parameter is used to set the fine shutter speed. This is mainly used to shoot the computer graphic screen.
You can set the shutter speed as necessary for vertical frequency of the computer graphic screen, from those that change continuously within the range between 1/60.4 and 1/350 seconds.
Under artificial lighting, especially the likes of fluorescent lamps or mercury lamps, the luminance of R, G and B changes in synchronization with the frequency of the power supply. (This is called flickering.) If you use certain shuuter speeds under such lighting, flickering may increase. In 60-Hz areas, color flickering may occur. In the 50-Hz area, flickering can be reduced by setting the shutter speed to 1/100 seconds.

Note

You cannot use the electronic shutter in super EVS mode.

[1)] **CLS:** Abbreviation of Clear Scan

Super EVS (Enhanced Vertical Definition System)

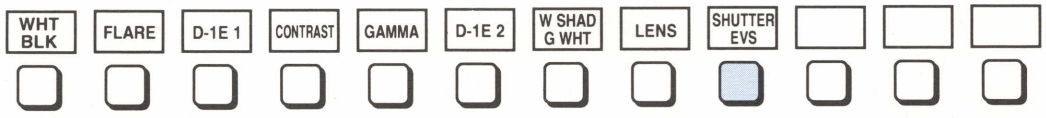
Super EVS (Enhanced Vertical Definition System) is the parameter used to improve the resolution degree of a moving subject. After-image improvement is such that it is the same as in frame readout mode. Vertical resolution improvement is such that it is the same as in frame readout mode. However, the sensitivity is reduced down to 1/2 in inverse proportion to the vertical resolution. Thus, you can set the vertical resolution degree improvement ratio to one of 0.125/0.25/0.375/0.5/0.675/0.75/0.875 according to the subject.

Adjustment

1 Prepare for the adjustment.

Subject	Subject to be adjusted
Focus	Set the focus correctly
Light source (light condition)	Use the same light source as that usef for the actual shooting.
OPERATE/CCU/TEST button	Press the OPERATE button to light the lamp.
Filter	Set according to the color temperature of the light source.
Measuring instruments	Video monitor

2 Select the adjustment item.
By pressing the SHUTTER/EVS button, parameters appear on the display. Perform the adjustment using the adjustment dial.



Items	SHUTTER (Fixed shutter speed)	CLS (Continuous variable shutter speed)	SUPER EVS	———
Adjustable range	CLS, 1/100, 1/125, 1/250, 1/350, 1/500, 1/1000, 1/2000	1/60.4 to 1/350	1 (0.125) to 7 (0.875)	———
Adjustment dial	MIN MAX	MIN MAX	MIN MAX	

3 Make the adjustment.

Adjustment point	Part to be adjusted
Adjustment value	Adjust acording to your taste.

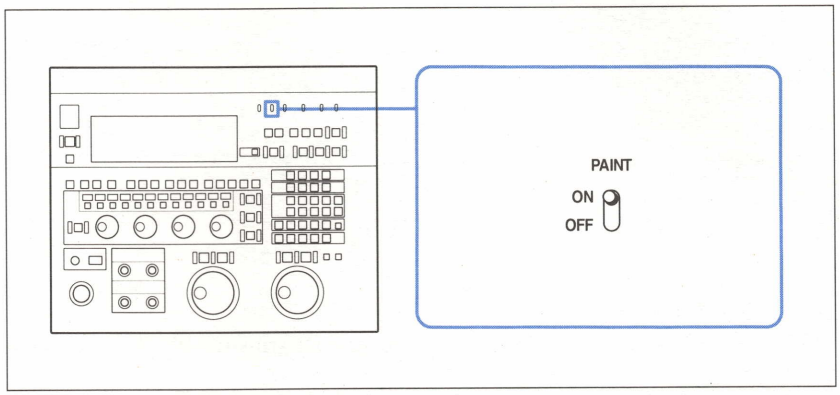
Notes

- To use CLS (clear scan), set SHUTTER to CLS.
- To use super EVS mode, press SHUTTER EVS button to light the lamp.
- To use the electronic shutter, press the SHUTTER button to light the lamp.

4-7 Adjustment Controls

This section explains how to adjust the white balance, black balance and master black with the controls.

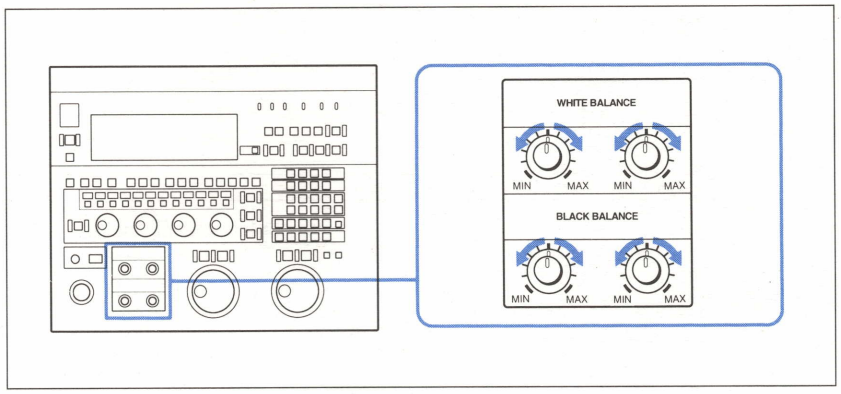
4-7-1 Paint Switch



Paint switch

ON	Adjustment with the controls is effective.
OFF	Adjustment with the controls is not effective.

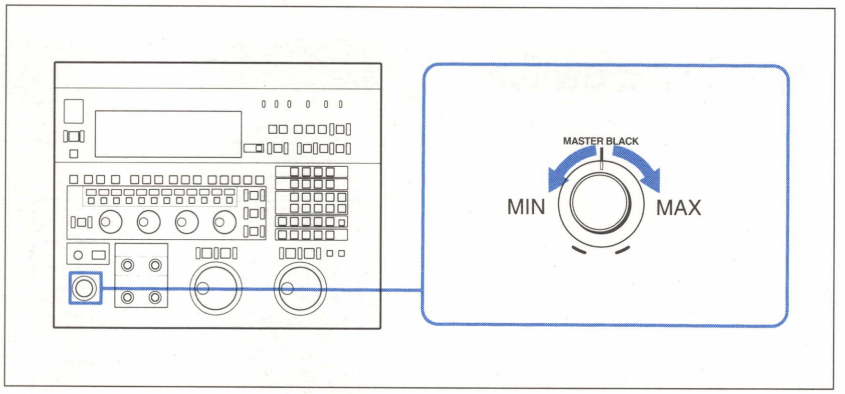
4-7-2 Adjustment of Black Balance/White Balance



Adjustment controls for black balance/white balance

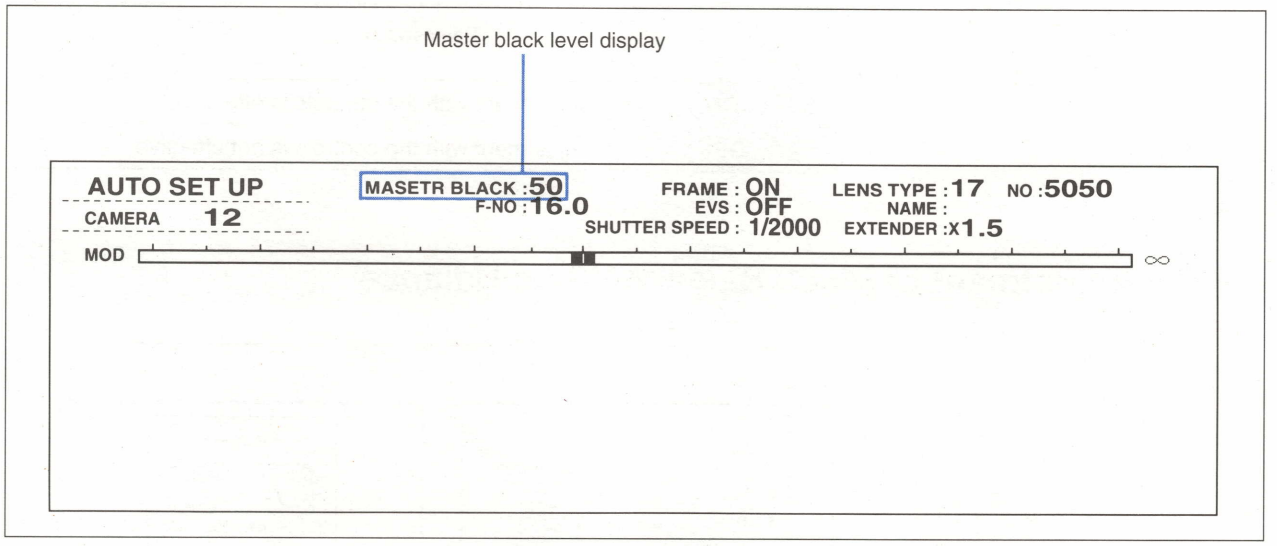
Adjust the white level of R and B by turning the WHITE BALANCE knobs.
Adjust the black level of R and B by turning the BLACK BALANCE knobs.

4-7-3 Adjustment of Master Black



Master black adjustment section

Adjust the master black level by turning the MASTER BLACK knob.



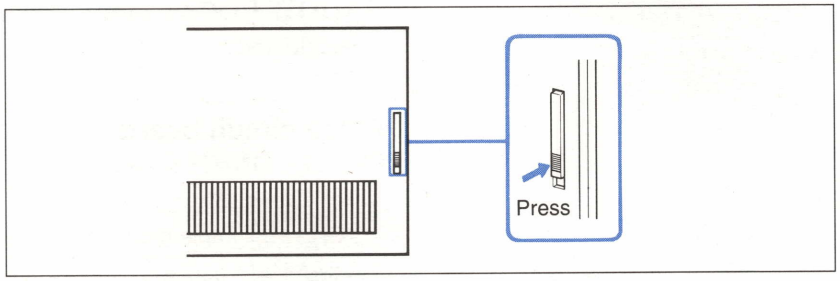
Master black level display

4-8 Internal Operation

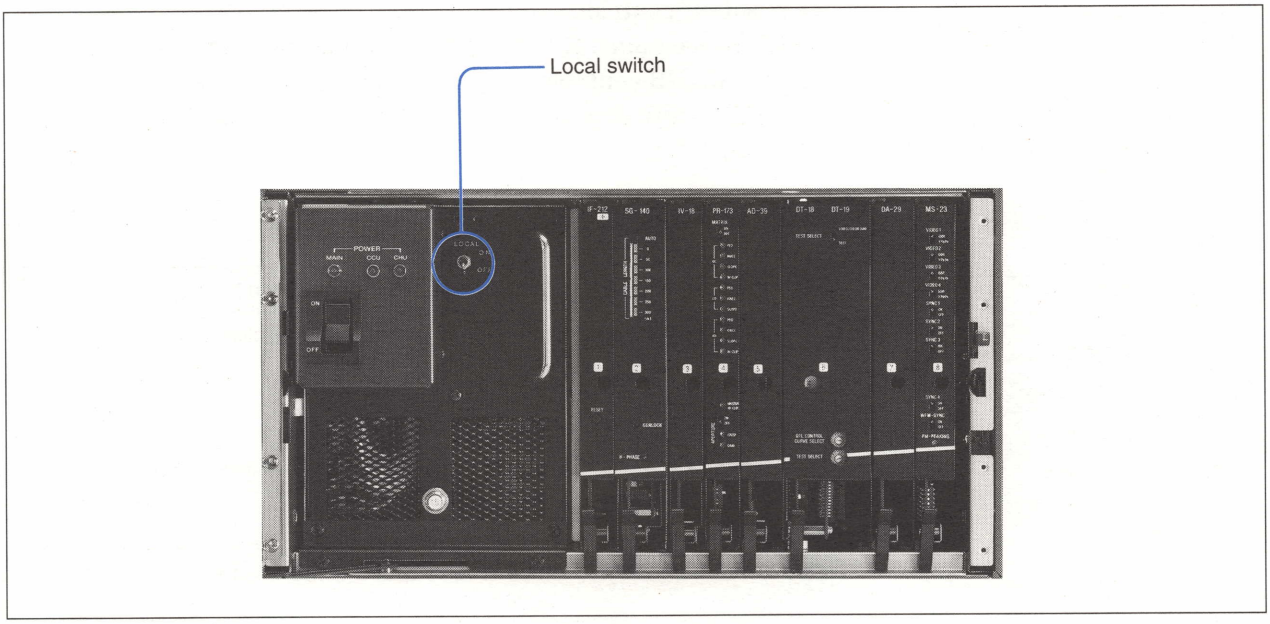
4-8-1 Internal Operation of the HDCS-350 HD Camera Signal Processor

How to open the front panel

Open the front panel to perform an operation inside the unit.



Opening the front panel of the CCU



LOCAL switch inside the HDCS-350

Change the power on/off mode using the LOCAL switch.

ON	Separates unit power on/off control from the HDCS-350
OFF	Normally keep this switch set to OFF.

IF-212 circuit board

RESET button: Resets the system

SG-140 circuit board

AUTO lamp: Lights while automatically determing the camera cable length.

CABLE LENGTH indicator: Indicates the camera cable length.

GENLOCK lamp: Lights when synchronizing with the external sync signal.

H-PHASE volume control: Adjusts the horizontal phase.

WINDOW LOCAL lamp: Lights when the manual window motion is selected.

PR-173 circuit board

MATRIX ON/OFF switch:

ON	Implements the masking correction circuit
OFF	Does not implement the masking correction circuit.

RED R/G/B controls: Adjust the pedestal level

KNEE (knee point) R/G/B controls: Adjust the knee point

SLOPE R/G/B controls: Adjust the slope above the knee point.

W CLIP (white clip) R/B/MASTER controls: Control the white clip level.

APERTURE ON/OFF switch:

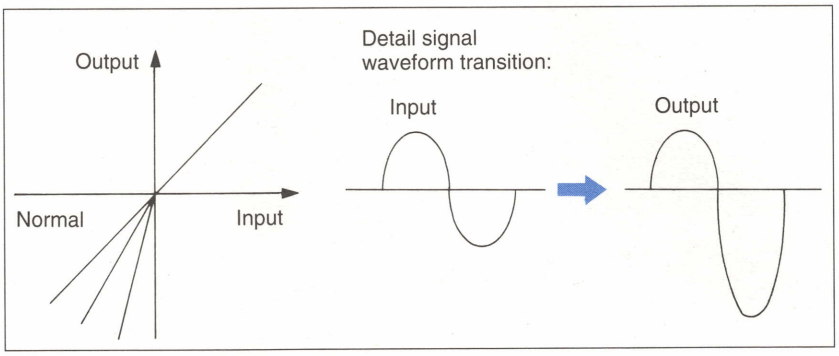
ON	Implements the contour correction circuit.
OFF	Does not implement the contour correction circuit

DT-18/19 circuit board

TEST SELECT switch: Selects a test signal obtained when pressing the TEST button on the panel.

VIDEO/COLOR BAR	Alternates between camera video and color bar signals in a H-cycle
TEST	Signal selected by the TEST SELECT switch

DTL (Detail) CONTROL CURVE SELECT switch: Selects detail signal waveform. Normally, "0" is selected.



Detail control curve

TEST SELECT switch: Selects one of the ten TEST signal patterns. Normally, TEST signal F (color bar) is selected.

MS-23 circuit board

VIDEO 1/2/3/4 switches:

GBR	Outputs R, G and B video signals.
YPBPR	Outputs Y, P_B and P_R video signals.

SYNC 1/2/3/4 switches:

ON	Enables sync signal addition to the video signal.
OFF	Disables sync signal addition to the video signal.

WFM (waveform monitor)-SYNC switch:

ON	Enables sync signal addition to the waveform monitor video signal.
OFF	Disables sync signal addition to the waveform monitor video signal.

PM (picture monitor)-PEAKING control: Adjusts the contour enhancing level of the picture monitor image.

For details on internal switch settings and control adjustments, refer to the maintenance manual.

Chapter 5 File Operation

This chapter explains how to store set-up data.

5-1 What is File Operation? 5-2
5-1-1 File System 5-2
5-1-2 File Items 5-3
5-2 Reference File Operation 5-4
5-2-1 Data Stored to a File 5-4
5-2-2 Registration 5-4
5-3 Lens File Operation 5-5
5-3-1 Data Stored to a File 5-5
5-3-2 Registration 5-6
5-3-3 Call 5-8
5-3-4 Display of the Lens Data 5-8
5-3-5 Erasing 5-9
5-4 Setup File Operation 5-10
5-4-1 Data Stored to a File 5-10
5-4-2 Registration 5-11
5-4-3 Call 5-11
5-5 Scene File Operation 5-12
5-5-1 Data Stored to a File 5-12
5-5-2 Registration 5-13
5-5-3 Call 5-13

5-1 What is File Operation?

5-1-1 File System

The CCU can store the following three types of files. These contain reference or adjustment data for the camera.

- Reference file
- Setup files
- Scene files

File operations such as file storage and recall are performed from the HDCO-350 or remote control panel. The types and numbers of files that can be used vary with the type of control panel being used.

Reference file

The reference file stores the reference values for auto setup adjustment. When auto setup adjustment is performed, the values of control items are automatically adjusted to the reference file values. This file is the basis of the entire file system. The initial reference values for each camera are factory set. You can change them as desired and store them in a reference file.

The contents of the reference file remain unchanged until new reference values are set and stored.

Setup files

Setup files store different sets of manually adjusted setup data. For example, you may store setup data adjusted for use under different indoor and outdoor shooting conditions in numbered setup files. You can recall them as required to shoot under similar conditions. When a setup file is recalled, the camera is set up automatically according to the data contained in the file. This enables you to start shooting immediately.

The contents of the setup files remain unchanged until new data is stored in them.

Up to four setup files can be created.

Scene files

Scene files store painting data for different scenes. For example, data prepared at rehearsal for a particular scene may be stored in a scene file. When shooting the scene, you can recall the scene file to automatically reproduce the same camera settings as those used at rehearsal.

The contents of scene files remain unchanged until new data is stored in them.

Up to four scene files can be created on the basis of each setup file (that is, a total of 16 scene files based on setup files 1 to 4).

5-1-2 File Items

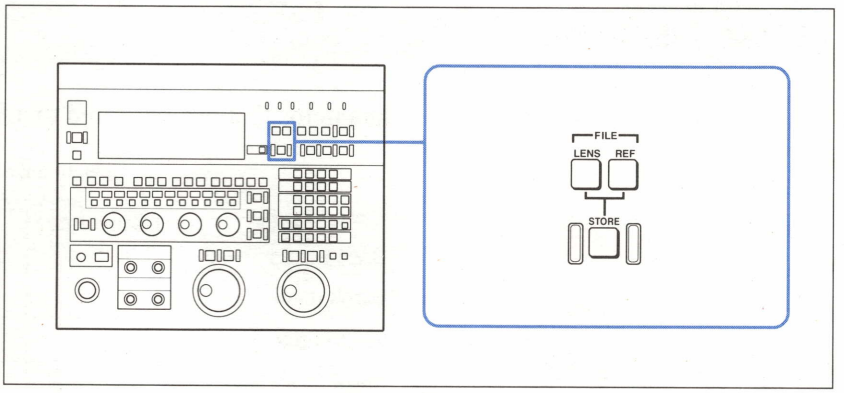
Data items that can be stored to a file are listed below.

List of data stored to a file

File name / Data items	Reference file	Lens file	Setup file	Scene file
Black level	○	—	○	○
White balance	—	○ (Only B and R)	—	
Flare	○	○	○	
Gamma				
Black gamma				
Black set			—	—
Gamma select			○	○
Master gain			—	
Filter				
Knee point/slope				
Detail gain		—		
Threshold				
Crispening				
Frequency	—			
Limit level			○	
V ratio				
Source				
White shading		○		—
Shutter speed		—	—	○
Super EVS				
Lens No./name/ max. and min. value of the F value		○		—

○ : Data that can be stored
— : Data that cannot be stored

5-2 Reference File Operation



Reference file operation block

The reference file is data used to register target values for the automatic adjustment of screen levels.
You can register one set of target values.

5-2-1 Data Stored to a File

Black level	Master, B, R
Gamma	Master, B, R
Flare	G,B,R

5-2-2 Registration

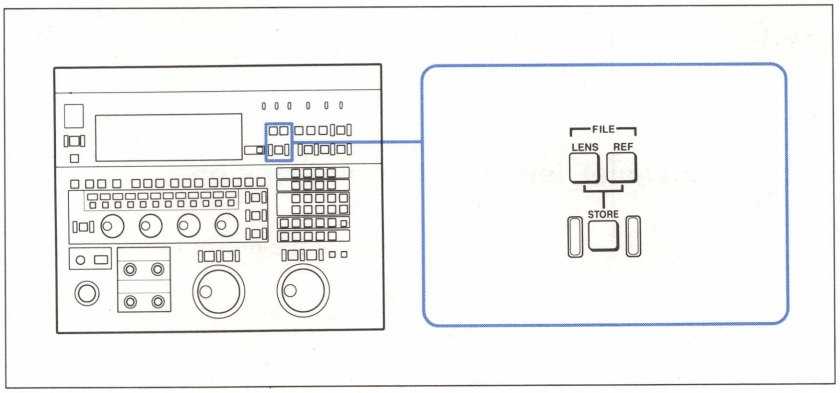
Register the reference files as follows.

1 Press the REF FILE button to light the lamp.

2 Press the STORE button.
The current settings are registered in the file.

Resistration can be prohibitted using the switch inside the panel.
Refer to the maintenance manual for detailed information about how to prohibit.

5-3 Lens File Operation



Lens file operation block

The lens file performs the following functions.

- The repetitive setup operations required at every lens change are eliminated by registering lens-specific information, such as video level.
- Individual lens data such as name, number and F value can be registered in this file. When registered, information on the installed lens and the current iris value appear on the EL display.

5-3-1 Data Stored to a File

You can store the following data.

Level

White balance	B,R
White shading	G.B.R
Flare	G.B.R

Lens data indication

Lens number
Lens name
Maximum and minimum F values

5-3-2 Registration

Registering level, lens number and lens name

Execute the registration in a stable environment such as a studio.

1 Install the lens to be registered and shoot a subject.

2 Press the LENS FILE button to light the lamp. Set the lens number, lens name and lens type.

Items	———	**LENS NO** (Lens number) **NAME** (Lens name)		**LENS TYPE**
		CURSOR (Move cursor)	**CHARACTER** (Character setting)	
Adjustable range	———	LENS NO: 4 digits NAME: 16 characters	(See below.)	0 to 63
Adjustment dial		Left Right	See below	Small Large
Explanation	———	———	Turn clockwise → ␣ A B C ... Z ! ” # $ % & ’ ( ) ✻ + , –. / : ; < = > ? @ 1 2 3..... 9	(Automatically set when using the LENS TYPE communication function.)

3 Adjust R, G and B white level, white shading and flare (items indicated with “◇ ◇”).

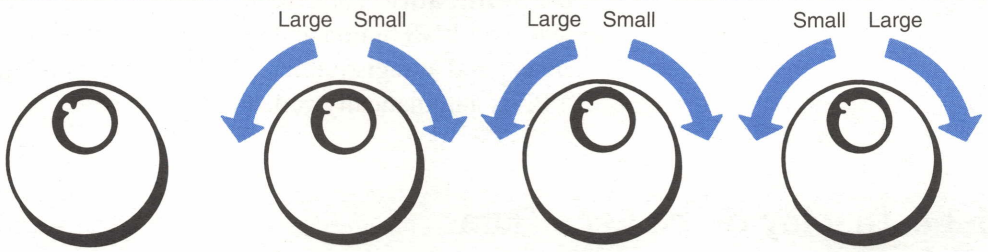
4 Press the STORE button.
The lamp remains lit during registration and goes off once complete.

5 Repeat steps **1** to **4** for all lens to be registered.

Registering F value data for indicating the iris value

1 Press the LENS button to light the corresponding lamp. (Do not light the LENS FILE lamp.)

2 Make the necessary adjustments and settings as follows.

Items		F-NO MAX (Maximum F value)	F-NO MIN (Minimum F value)	LENS TYPE (Lens type)
Adjustable range		8 to 22 (0.1 step)	1.2 to 8 (0.1 step)	0 to 63
Adjustment dial				
Explanation		Set both MAX and MIN to 00 for a lens equipped with the F value communication function. If a deviation is found in the input value, a converted value is displayed by the following operation: Set the lens iris to the maximum F value and input that value to F-NO MAX. Then set the lens iris to the minimum F value and input that value to F-NO MIN. → The correctly adjusted iris value is displayed.		

3 Press the LENS button so that the corresponding lamp goes off.

Lens type

Generally, the same lens type data is output from identical lenses. However, if multiple lens files are registered on the same LENS TYPE, subcodes, like 1-1, 1-2, 1-3,...., are automatically added to help distinguish them.

5-3-3 Call

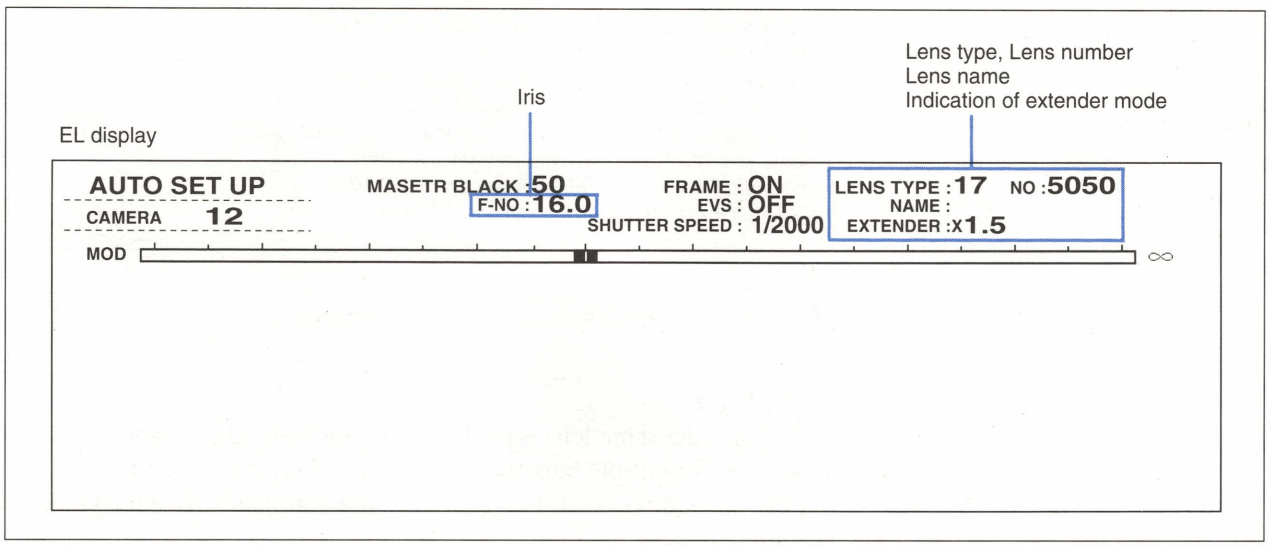
When installing a lens equipped with the LENS TYPE communication function

The file corresponding to the lens type data transmitted from the lens is automatically called up.
If a subcode is added to the LENS TYPE, turn the dial to change the subcode.

When installing a lens without the LENS TYPE communication function

Press the LENS button and input a gain corresponding to the lens type data entered at registration. The file corresponding to the LENS TYPE is automatically called up.

5-3-4 Display of the Lens Data



Lens data display

Iris value

Lens that transmits the iris value (iris position)

The iris value is sent from the lens. When MAN and MIN F values are input with the dial, the conversion takes place based on these values.

Lens other than the one which transmitte the iris value.

The F value is calculated using the IRIS CONT signal that controls the lens iris from the camera head.

5-3-5 Erasing

If "NO ROOM FOR LENS" appears at registration, a new lens file cannot be registered because the EEPROM is full.
Erase the last file in the EEPROM area, the thirteenth that is displayed automatically, or any other unnecessary file, as follows.

1 Make sure the displayed file is the one to be erased.

2 Press LENS FILE.

3 Press CLEAR.

4 Press LENS.

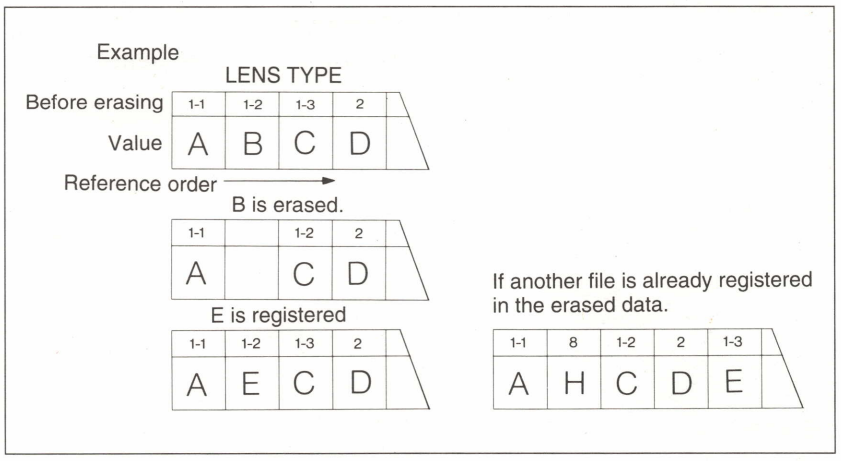
Erasing is completed. The display and setting change corresponding to the LENS TYPE of the erased file.

If no other file is registered for the same LENS TYPE
(ex. When erasing a file of the LENS TYPE 1)
LENS TYPE 1 remains as is and the setting changes to the preset value. (No compensation by the LENS FILE is given.) The message "NEW FILE" appears.

If two or more files are registered on the same LENS TYPE
(Ex. When erasing a file of LENS TYPE 1-2 among files 1-1 to 1-3)
The display "LENS TYPE" changes to 1-1, and the setting changes to the contents of the corresponding file.
Data stored as LENS TYPE1-3 before erasing is called as data for LENS TYPE1-2.

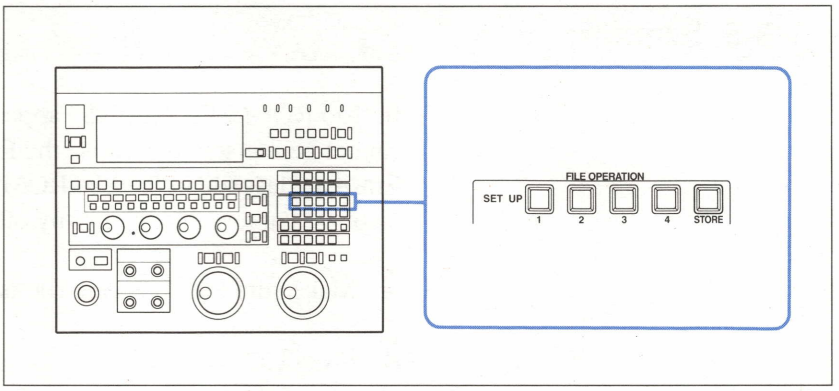
Note

A subcode is entered into the reference order of the EEPROM, and not of the file. Therefore, the subcode may change when the lens file is erased/registered, as in the following example.



Example of erasing a lens file

5-4 Setup File Operation



Setup file operation block

You can store a setting made on the panel to a file and call them up whenever necessary.

5-4-1 Data Stored to a File

You can store the following data to a file.

Level

Black level	Master B, R
Flare	G,B,R
Black gamma	
Gamma	Master B,R
Knee point/Knee slope	
White shading	G,B,R

SELECT button

Gamma selection

Contour

Adjusted values for items referred to in “D-IE 1” and “D-IE 2”.

5-4-2 Registration

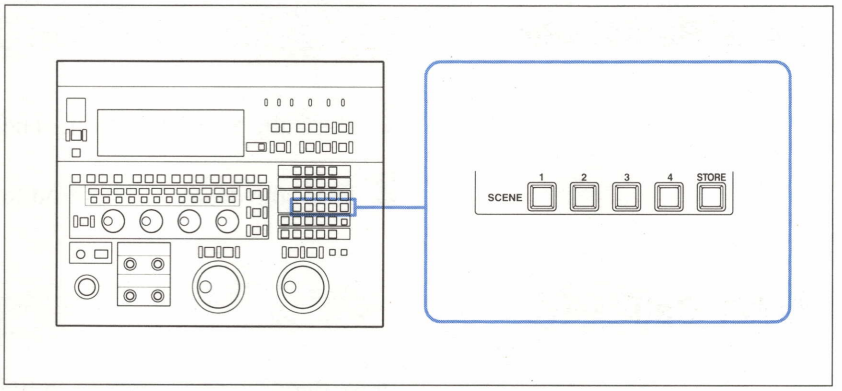
1 Press the STORE button. The lamp lights.

2 Press the desired file button (any of 1 to 4).

5-4-3 Call

Press the desired file button to light the corresponding lamp.
→ The contents of the called file are set in the panel.
The position of the adjustment controls has no influence on the display.

5-5 Scene File Operation



Scene file operation block

You can store settings made on the panel to a scene file and call them up whenever necessary.

5-5-1 Data Stored to a File

You can store the following data to a file.

Level

Black level	Master B, R
Flare	G,B,R
Black gamma	
White balance	G,B,R
Gamma	Master B,R
Knee point/Knee slope	
Shutter speed	
Super EVS	

SELECT buttons

Filter selection
Gamma selection
Gain selection

Contour

Adjusted values for items referred to in “D-IE 1” and “D-IE 2”.

5-5-2 Registration

1 Call the setup file to act as a base and make the necessary adjustments according to the scene.

2 Press the STORE button. The lamp lights.

3 Press the desired file button (any of 1 to 4).

5-5-3 Call

1 Call the setup file to be used as a base.

2 Press the desired file button to light the corresponding lamp. The contents of the called file are set on the panel. The position of adjustment controls has no influence on the display.

Chapter 6 Recording

This chapter explains the basic operating procedure involved in shooting, and various auxiliary operations.

6-1 Basic Operating Procedure 6-2
6-2 Operations Performed from the Camera 6-3
6-2-1 Kinds of Operation 6-3
6-2-2 Auxiliary Operation 6-4
6-3 Operations Performed from the Panel 6-6
6-3-1 Kinds of Operations 6-6
6-3-2 Intercom Operation 6-7
6-4 About Tally and Intercom Line 6-9
6-4-1 Route of the Tally Signal 6-9
6-4-2 Intercom Line 6-10

6-1 Basic Operating Procedure

This section explains the basic operating procedure involved in shooting.

Refer to the pages indicated in ( ).

1 Turn the power of the system on. (chapter 3 Starting the System)

2 Perform the auto setup operation as required (automatic level adjustment). (page 4-7)
Perform the auto setup operation in the following cases.
- When you use the system for the first time
- When you do not use the system for a long period after you turned off the power
- When the environmental condition changes suddenly.

3 Perform the basic settings according to your shooting condition. (page 4-3 to 4-6)

4 Adjust the black balance, white balance and delay automatically. (page 4-9)
- When yoiu performed the auto setup in step 2, you do not need to adjust the black balance.
- The delay is automatically adjusted when you turn on the power. But, perform the delay adjustment, as required.

5 Perform manual adjustments according to shooting conditions such as studio, field and scene. (page 4-10 and 4-38)
You can store the settings and the adjusted values taken in steps 3 and 5 into the setup file and the scene file. (chapter 5 File Operation)

6 Call the setup file and the scene file, as required. (page 5-10, 5-12 and 5-13)

7 Start shooting.

8 End shooting.

9 To shoot another scene, repeat steps 5 to 8.

6-2 Operations Performed from the Camera

6-2-1 Kinds of Operation

Camera engineers perform mainly camera work and the following works.

- Camera work (Angle setting, etc.)
- Adjustment operation (Lens operation such as iris/focus adjustment, etc.)
- Auxiliary operations (Filter change, etc.)

This section explains the auxiliary operations.
For details of other operations, refer to the operation manual for each unit.

Note

In the CCU operation system, all the switches of the HDC-500 HD color camera become ineffective. Those switches are controlled from CCU (panel).

Camera work

- Frame/angle setting
- Panning/tilting

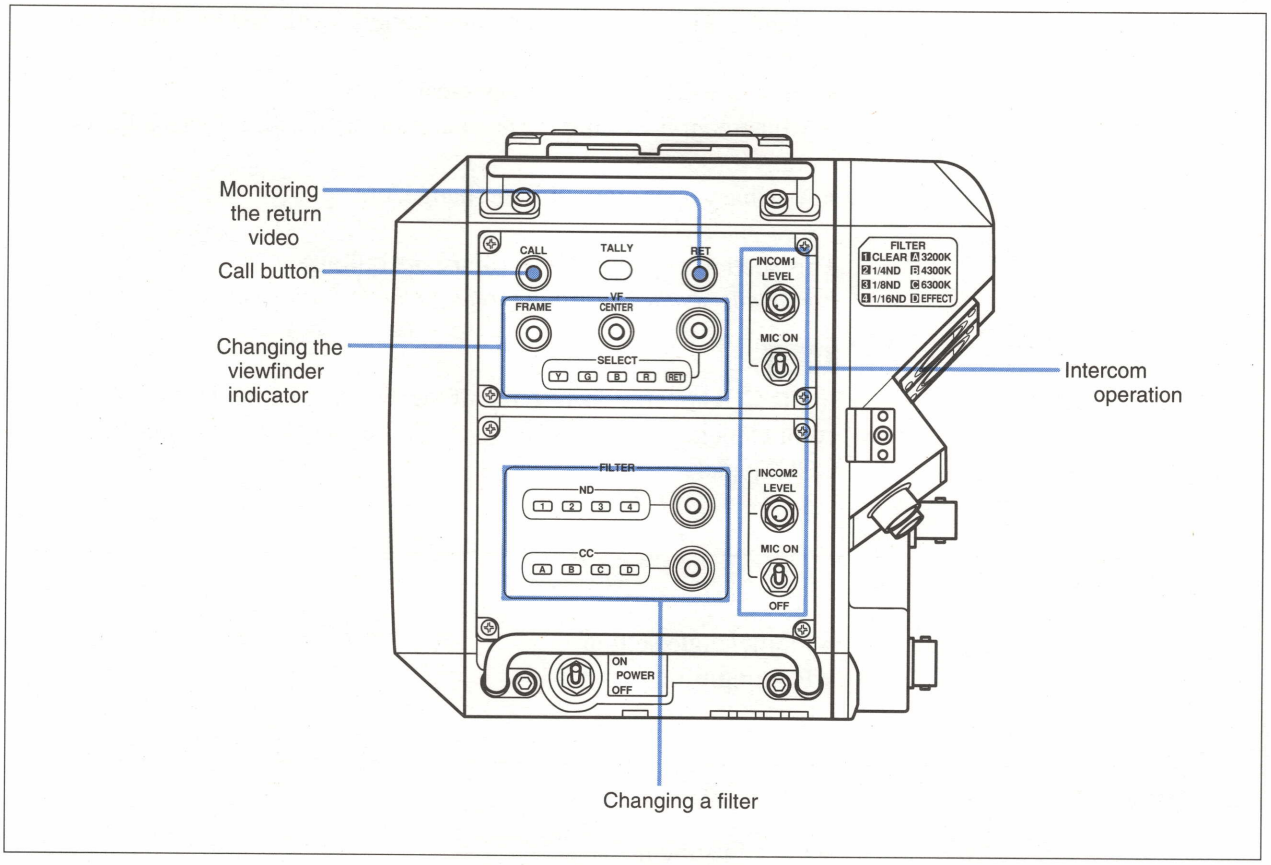
Adjustments

- Iris adjustment
- Focus adjustment
- Zooming

Auxiliary operations

- Filter change
- Center marker/frame display
- Monitoring R/G/B/Y signals or return video
- Intercom operation

6-2-2 Auxiliary Operation



Operation panel

Monitoring the return video

RET (return) button

To monitor the return video, press the RET button.
The picture of the return video signal appears in the viewfinder while this button is held down.

Intercom operation

CALL button

The red tally lamp on the HDCO-350 lights while this button is held down. If you press this button while the red tally lamp is lit, however the lamp goes off.

INCOM 1 MIC ON/OFF switch

ON: Turns on the microphone of the headset for INCOM 1. Inputs and outputs INCOM 1 signals.

OFF: Turns off the microphone of the headset for INCOM 1. Inputs INCOM 1 signals.

INCOM 2 MIC ON/OFF switch

ON: Turns on the microphone of the headset for INCOM 2. Inputs and outputs INCOM 2 signals.

OFF: Turns off the microphone of the headset for INCOM 2. Inputs INCOM 2 signals.

INCOM 1 LEVEL control

Adjusts the level of the received INCOM 1 audio.

INCOM 2 LEVEL control

Adjusts the level of the received INCOM 2 audio.

Changing a filter

Filter buttons

Select the desired filter using corresponding filter button.

ND: Changes the ND filter in the order of 1, 2, 3, 4 and 1... whenever you press this button.

1	CLEAR	Completely clear
2	1/4 ND	Reduces the light quantity to 1/4.
3	1/8 ND	Reduces the light quantity to 1/8.
4	1/16 ND	Reduces the light quantity to 1/16.

CC: Changes the CC filter in the order of A, B, C, D and A.. whenever you press this button.

A	3200 K	Use this filter when the color temperature of the lighting is 3200 K.
B	4300 K	Use this filter when the color temperature of the lighting is 4300 K.
C	6300 K	Use this filter when the color temperature of the lighting is 6300 K.
D	EFFECT	Special effect cross filter

Changing viewfinder indication

VF (viewfinder) buttons

Selects the viewfinder indication.

FRAME: Displays the HD safety zone and etc. in the viewfinder. Press this button again. The safety zone disappears.

CENTER: Displays the center marker on the viewfinder screen. Press this button again. The center marker disappears.

SELECT: The displayed signal changes in the order of Y, G, B, R, RET, Y....whenever you press this button.

Y	Y signal	R	R component
G	G component	RET	Return video
B	B component		

6-3 Operations Performed from the Panel

6-3-1 Kinds of Operation

Video engineers perform adjustment of the picture tone and video tone for all cameras constituting a multi-camera system, and control the system to ensure high-quality pictures from the panel.

The video engineers perform the following operations from the penel, at shooting.

- Main operation (starting the system, setting up)
- Operation during broadcasting/recording (fine adjustment of black balance/white balance, etc.)
- Auxiliary operation (intercom operation)

This section explains the auxiliary operations.
For other operations, see the chapter where each operation is explained.

Main operation

- Starting the system (chapter 3)
- Calling/modifying the setup file (pages 5-10 and 5-11)
- Calling/modifying the scene file (pages 5-12 and 5-13)

Operation during broadcasting/recording

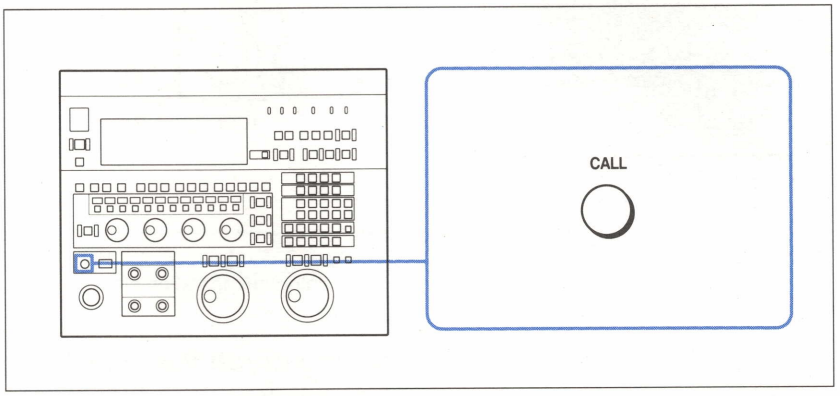
- Fine adjustment of white balance and black balance (page 4-37)
- Fine adjustment of master black (page 4-38)
- Fine adjustment of iris (page 3-9)
- Fine adjustment of focus (page 3-10)

Auxiliary operation

- Intercom operation (next page)
- Turning on/off the intercom microphone and switching the intercom line (page 6-8)

6-3-2 Intercom Operation

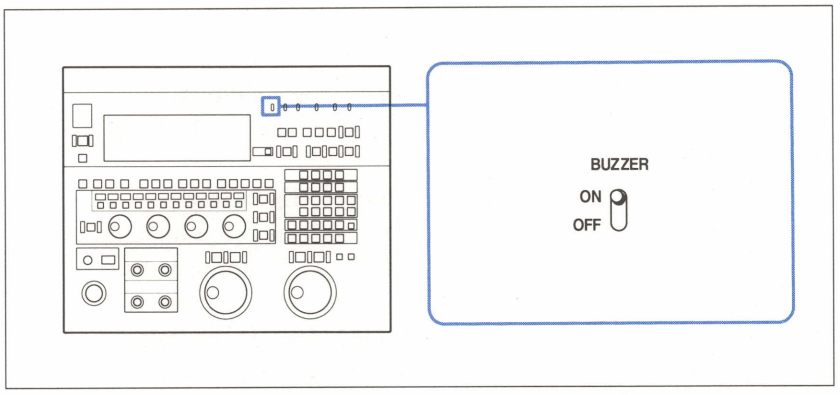
Calling a camera engineer



Calling a camera engineer

CALL: Press this button to call a camera engineer. While holding down this button, both the camera's tally lamp and the viewfinder's red tally lamp remain lit.

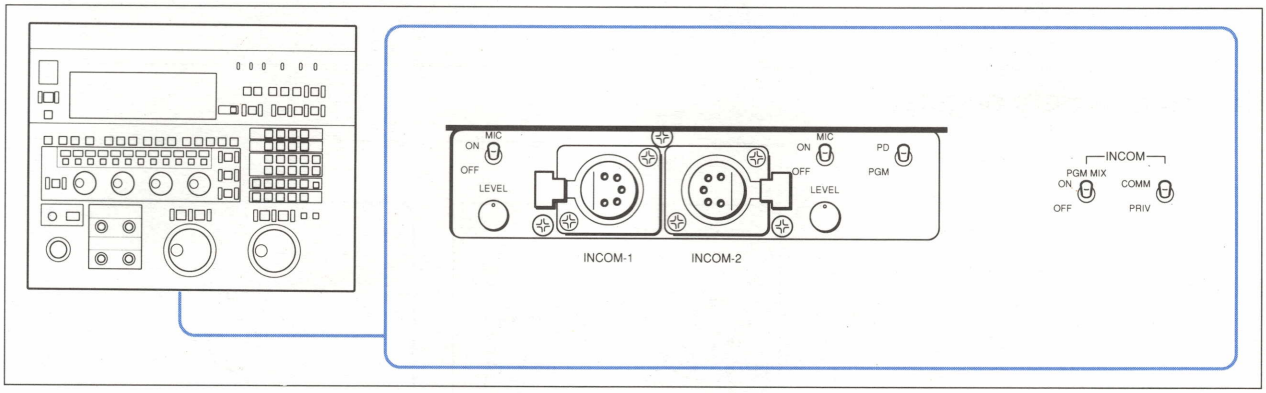
Buzzer



BUZZER switch

BUZZER: Set this switch to ON to sound a buzzer whenever the TALLY lamp lights and an error message is displayed.

Turning on/off the intercom microphone and switching intercom lines



Intercom operation block

Turning on/off the intercom microphone

MIC switch

Use this switch to turn the microphone on or off.

ON: Uses the headset microphone.

OFF: Does not use the headset microphone.

Switching intercom lines

You can switch lines by using the following three switches.

PD/PGM switch

Use this switch to switch the INCOM 2 circuit. (INCOM 1 is an engineering line).

PD[1]**:** Selects the producer line.

PGM[2]**:** Selects the program audio only.

PGM MIX switch

ON: Mixes program audio with INCOM 1 and 2.

OFF: Does not mix the program audio.

COMM/PRIV switch

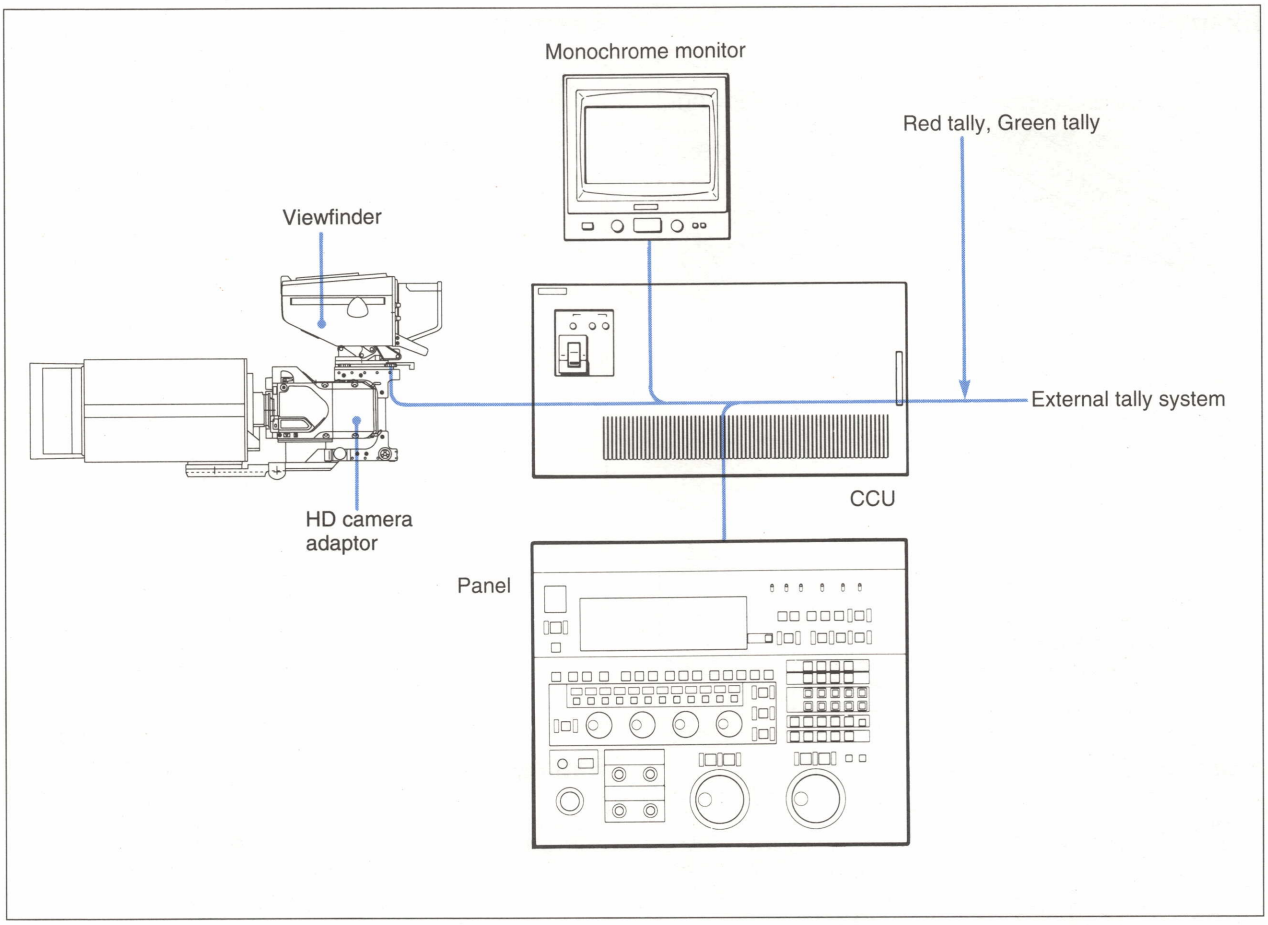
COMM[3]**:** Connects to external intercom lines.

PRIV[4]**:** Disconnects to external intercom lines.

[1] **PD:** Abbreviation for producer
[2] **PGM:** Abbreviation for program
[3] **COMM:** Abbreviation for common
[4] **PRIV:** Abbreviation for private

6-4 About Tally and Intercom Line

6-4-1 Route of the Tally Signal

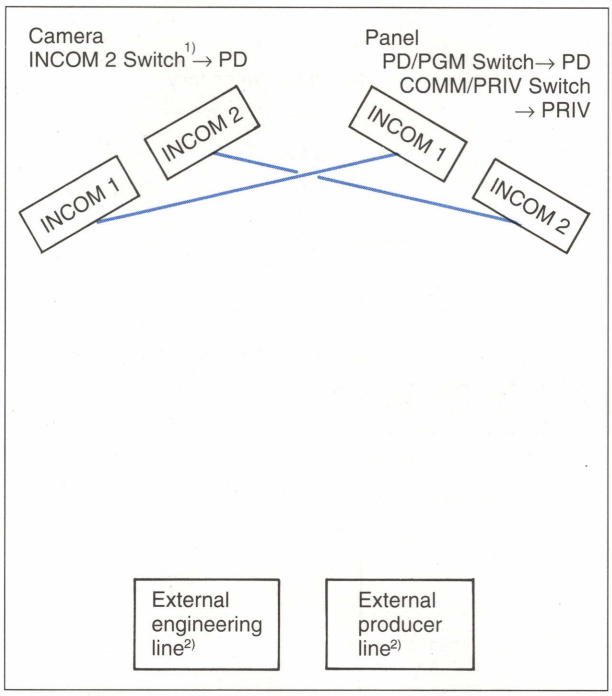


Route of the tally signal

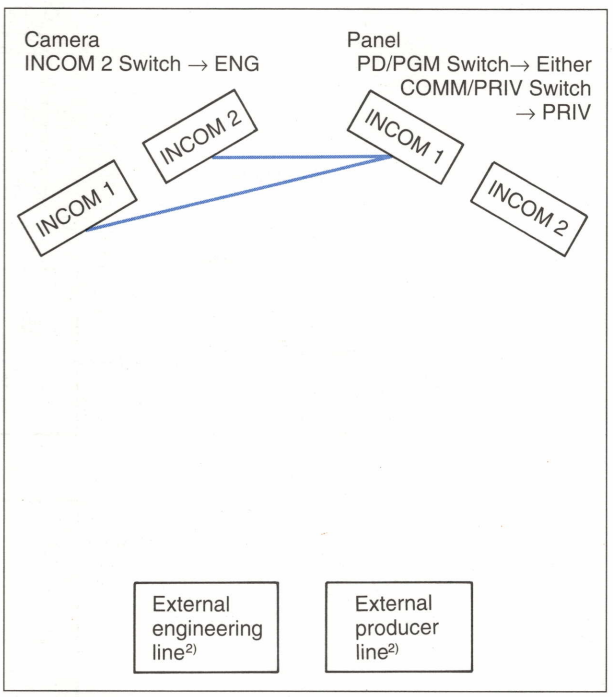
The RED TALLY on the panel lights when the camera adaptor's CALL button is pressed. (It goes off when overlapped when the red tally signal sent from the external tally system.)

6-4-2 Intercom Line

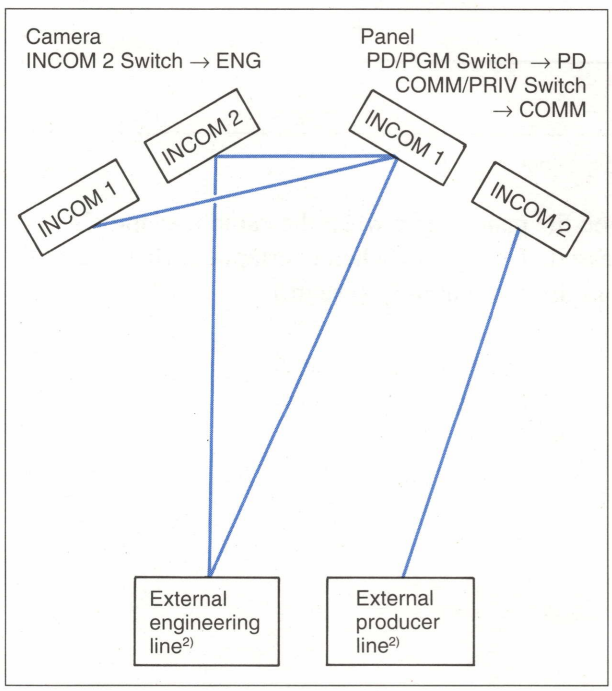
Example 1



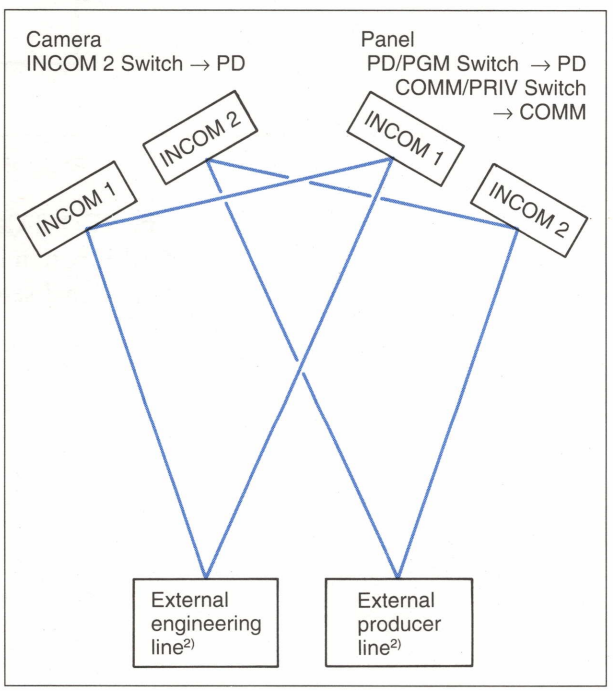
Example 2



Example 3



Example 4



1) **INCOM 2 Switch**
This INCOM 2 Switch of the camera is located on the AU160 circuit board of the HDCA-350 HD camera adaptor. For details, see the maintenance manual.

2) Connect the external engineering line and the external producer line to CCU.

Chapter 7 Appendixes

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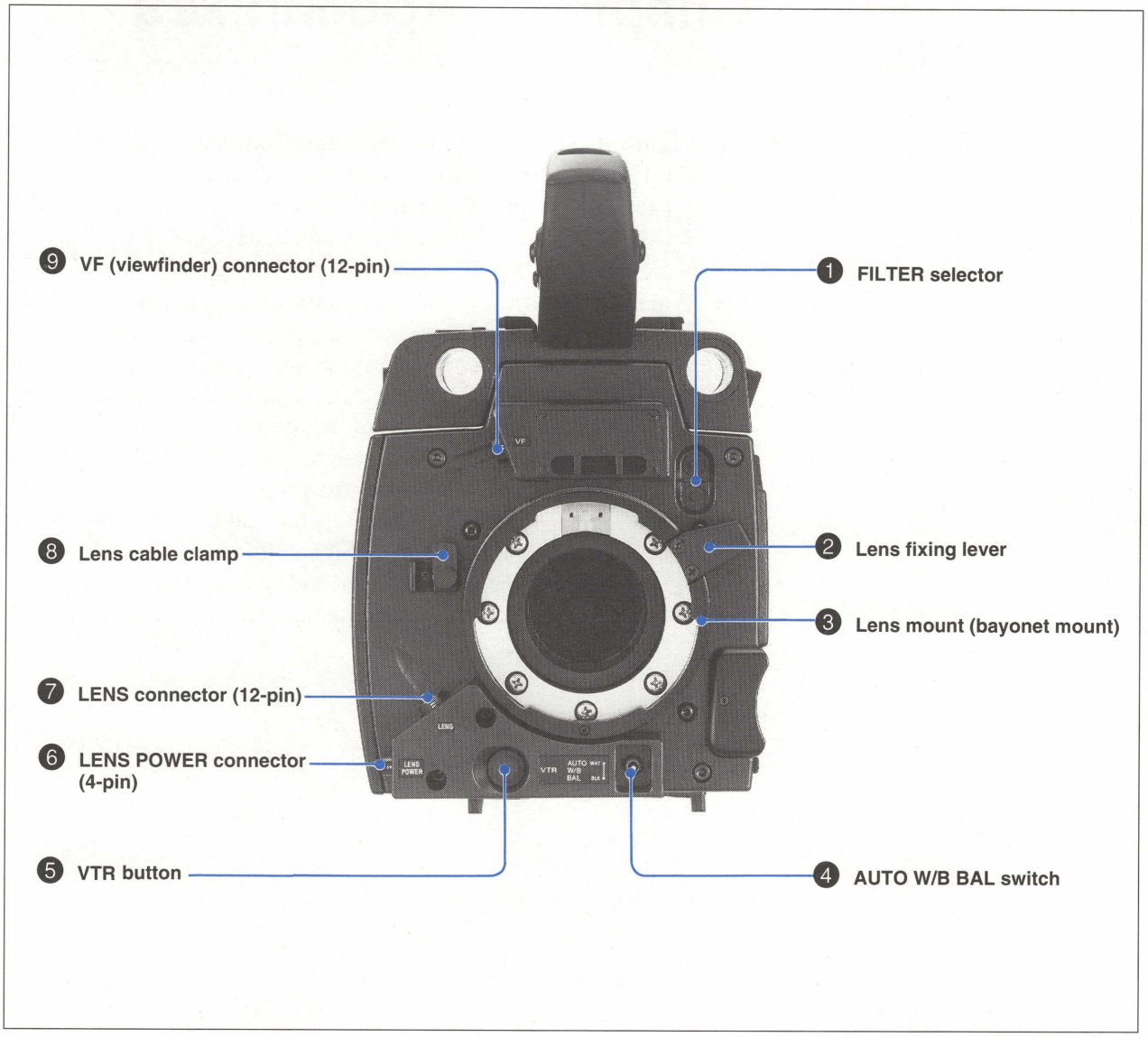
7-1 Location and Function of Parts and Contorls

7-1-1 HDC-500 HD Color Camera

Note

When the camera is connected to the CCU, all switches of the camera become ineffective.



Front

❶ FILTER selector
Selects the filter.

❷ Lens fixing lever
After attaching the lens in the lens mount ❸ turn the lens mount ring clockwise with this lever to secure the lens.

❸ Lens mount (bayonet mount)
Attach the lens.

❹ AUTO W/B BAL switch
Adjusts the white balance and black balance automatically.

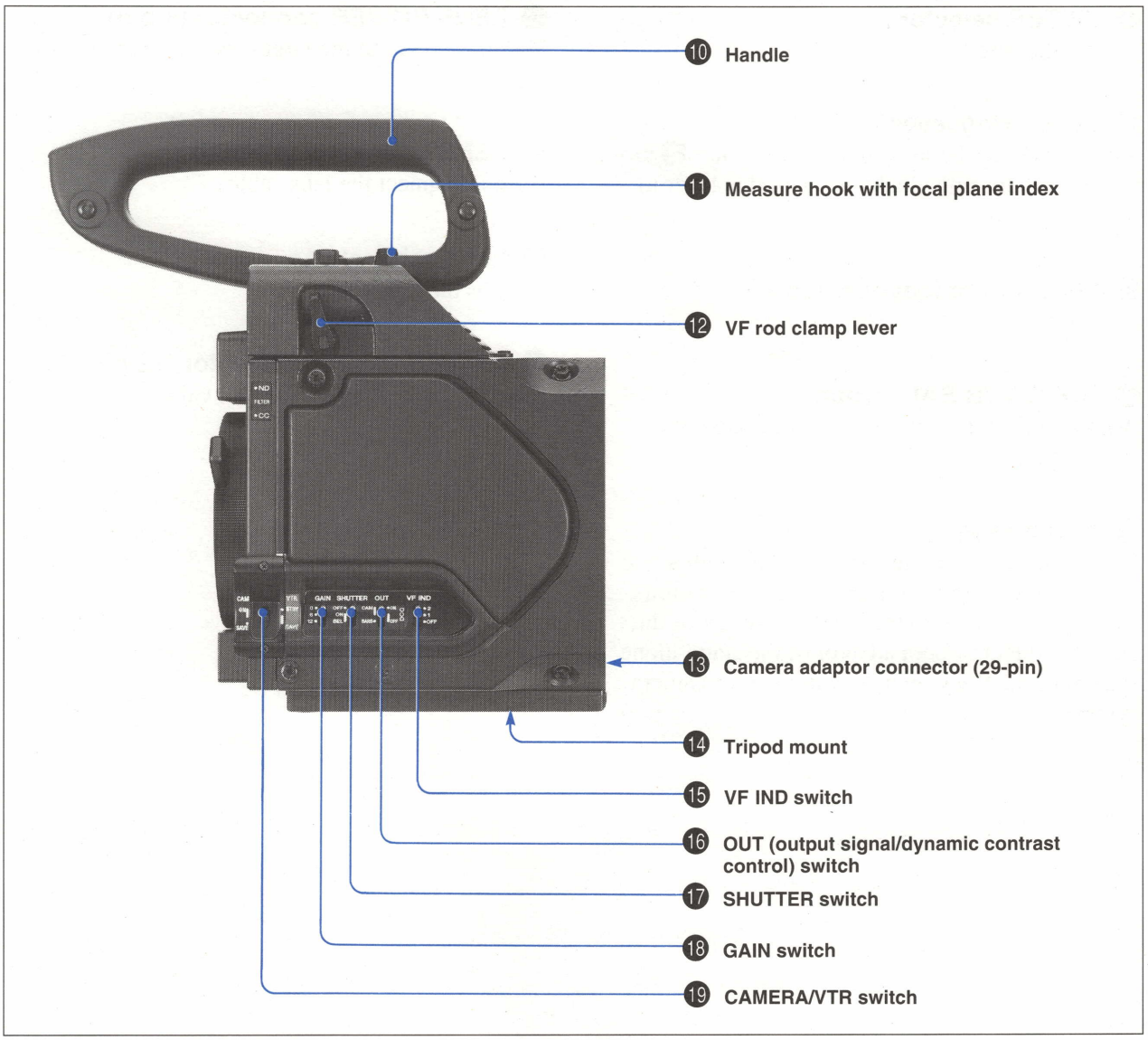
❺ VTR button
Recording can be started and stopped from a portable VTR (on the market in the near future), which is connected to the VTR connector of the HDCA-50 HD camera adaptor of the stand-alone system of the Sony high definition color camera system.

❻ LENS POWER connector (4-pin)
Supplies power to the large-size lens and box-size lens.

❼ LENS connector (12-pin)
Used to connect the lens cable.

❽ Lens cable clamp
Clamps the lens cable.

❾ VF (viewfinder) connector (12-pin)
Used to connect the viewfinder cable.


⑩ Handle
⑪ Measure hook with focal plane index
⑫ VF rod clamp lever
⑬ Camera adaptor connector (29-pin)
⑭ Tripod mount
⑮ VF IND switch
⑯ OUT (output signal/dynamic contrast control) switch
⑰ SHUTTER switch
⑱ GAIN switch
⑲ CAMERA/VTR switch

Side panel

⑩ Handle
Carry the camera by holding this handle. Also, you can shoot a subject from low angles by holding this handle. Remove this handle when mounting the 7-inch viewfinder or large-size lens.

⑪ Measure hook with focal plane index

⑫ VF rod clamp lever

⑬ Camera adaptor connector (29-pin)
Used to connect to the CHU connector of the camera adaptor.

⑭ Tripod mount
Attach the camera directly to the tripod or by using the tripod attachment.

⑮ VF IND (indicator) switch
Switches the display mode in the viewfinder screen.

⑯ OUT (output signal/dynamic contrast control) switch

Selects the video signal output to the viewfinder/ video monitor/VTR. You can use the DCC (dynamic contrast control) function when selecting the video signal that is being shot by the camera.

BARS DCC OFF: Outputs color bar signals. The DDC circuit becomes ineffective.
Set this switch to this position in the following cases.
- When adjusting the video monitor
- When outputting the color bar signals
- When changing to VF menu mode (when the HDCA-50 is connected)

CAM DCC OFF: Outputs the video signal that is being shot by the camera. The DCC circuit becomes ineffective.

CAM DCC ON: Outputs the video signal that is being shot by the camera. The DCC circuit becomes effective.

⑰ SHUTTER switch

Set this switch to ON when using the electronic shutter. Whenever setting the switch to the SEL side, the shutter speed is changed.

⑱ GAIN switch

Adjusts the video output level. When the lighting is insufficient and the picture on the monitor is too dim, set this switch to the appropriate position.

0: Normally set the switch to this position.
6: Raises the video output level by 6 dB.
12: Raises the video output level by 12 dB.

⑲ CAMERA/VTR switch

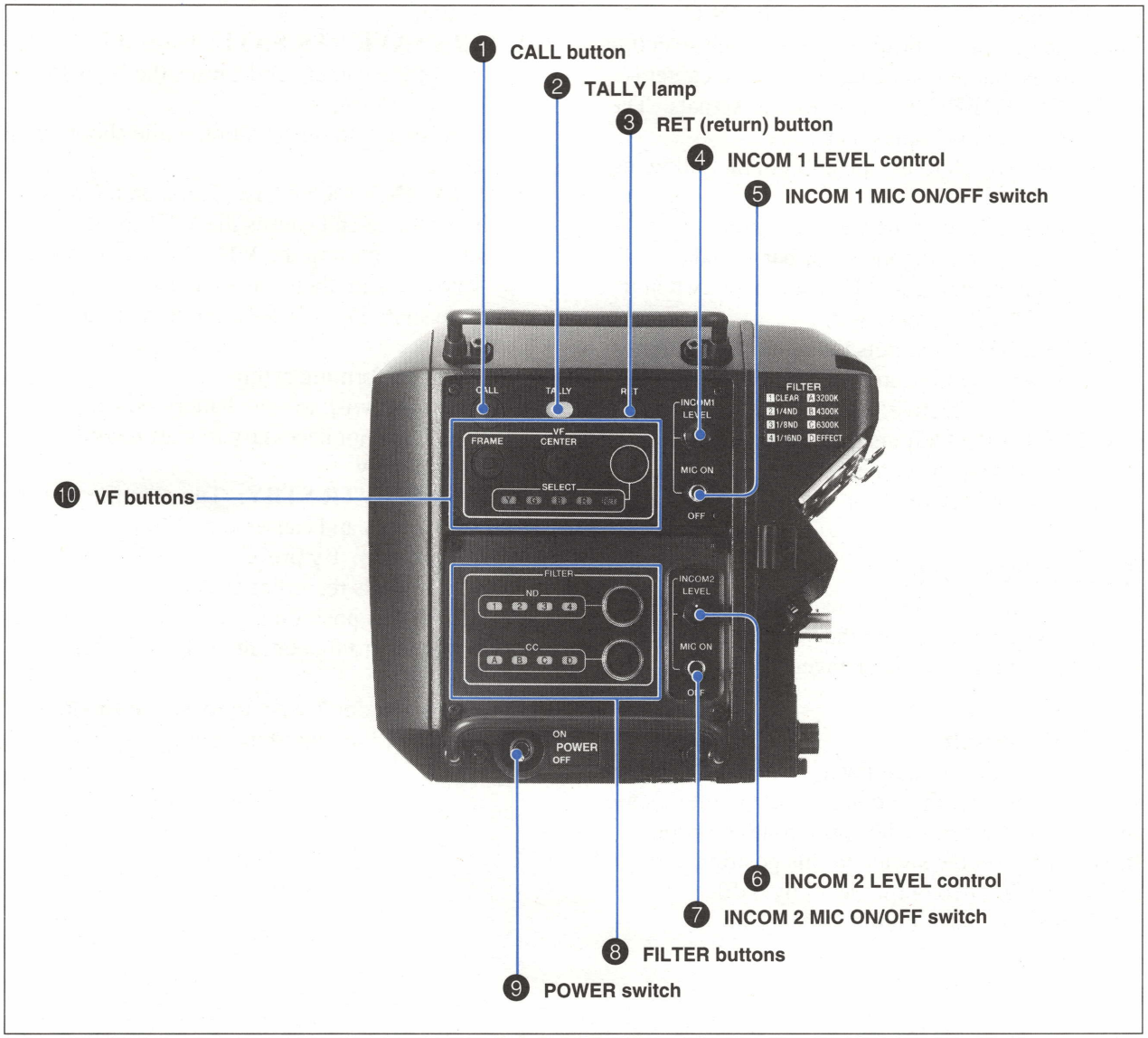
Set the switch to the appropriate position according to the shooting condition to reduce power consumption.

CAMERA SAVE VTR SAVE: Turns off the power of the camera and causes the VTR to enter save mode.
Set the switch to this position while shooting is paused.

CAMERA ON VTR SAVE: Turns on the power of the camera and causes the VTR to enter save mode. By pressing the VTR button, the VTR is servo-locked, then starts recording.
Set the switch to this position in the following cases.
- When performing setup
- When you wish to save battery power
- When it is not necessary to start recording immediately

CAMERA ON VTR STBY: Turns on the power of the camera and causes the VTR to enter standby mode. By pressing the VTR button, the VTR starts recording immediately. Set the switch to this position in the following cases.
- When recording continuously with little pausing
- When you don't wish to loose the shooting chance of the important scene.

7-1-2 HDCA-350 HD Camera Adaptor



Operation panel

❶ CALL button
The red tally lamp on the HDCO-350 lights while this button is held down. If you press this button while the red tally lamp is already lit, however, the lamp goes off.

❷ TALLY lamp
Lights when called from the panel.

❸ RET (return) button
The return video appears in the viewfinder while this button is held down.

❹ INCOM 1 LEVEL control
Adjusts the level of the received INCOM 1 audio.

❺ INCOM 1 MIC ON/OFF switch

ON: Turns on the microphone of the headset for INCOM 1. Inputs and outputs the INCOM 1 signals.

OFF: Turns off the microphone of the headset for INCOM 1. Inputs the INCOM 1 signals.

❻ INCOM 2 LEVEL control

Adjusts the level of the received INCOM 2 audio.

❼ INCOM 2 MIC ON/OFF switch

ON: Turns on the microphone of the headset for INCOM 2. Inputs and outputs the INCOM 2 signals.

OFF: Turns off the microphone of the headset for INCOM 2. Inputs the INCOM 2 signals.

❽ FILTER buttons

ND: Changes the ND filter in the order of 1, 2, 3, 4 and 1... whenever you press this button.

1	CLEAR	Completely clear
2	1/4 ND	Reduces the light quantity to 1/4.
3	1/8 ND	Reduces the light quantity to 1/8.
4	1/16 ND	Reduces the light quantity to 1/16.

CC: Changes the CC filter in the order of A, B, C, D and A.. whenever you press this button.

A	3200 K	Use this filter when the color temperature of the incoming light is 3200 K.
B	4300 K	Use this filter when the color temperature of the incoming light is 4300 K.
C	6300 K	Use this filter when the color temperature of the incoming light is 6300 K.
D	EFFECT	Special effect cross filter

❾ POWER switch

ON: Turns on the power.

OFF: Turns off the power.

❿ VF (viewfinder) buttons

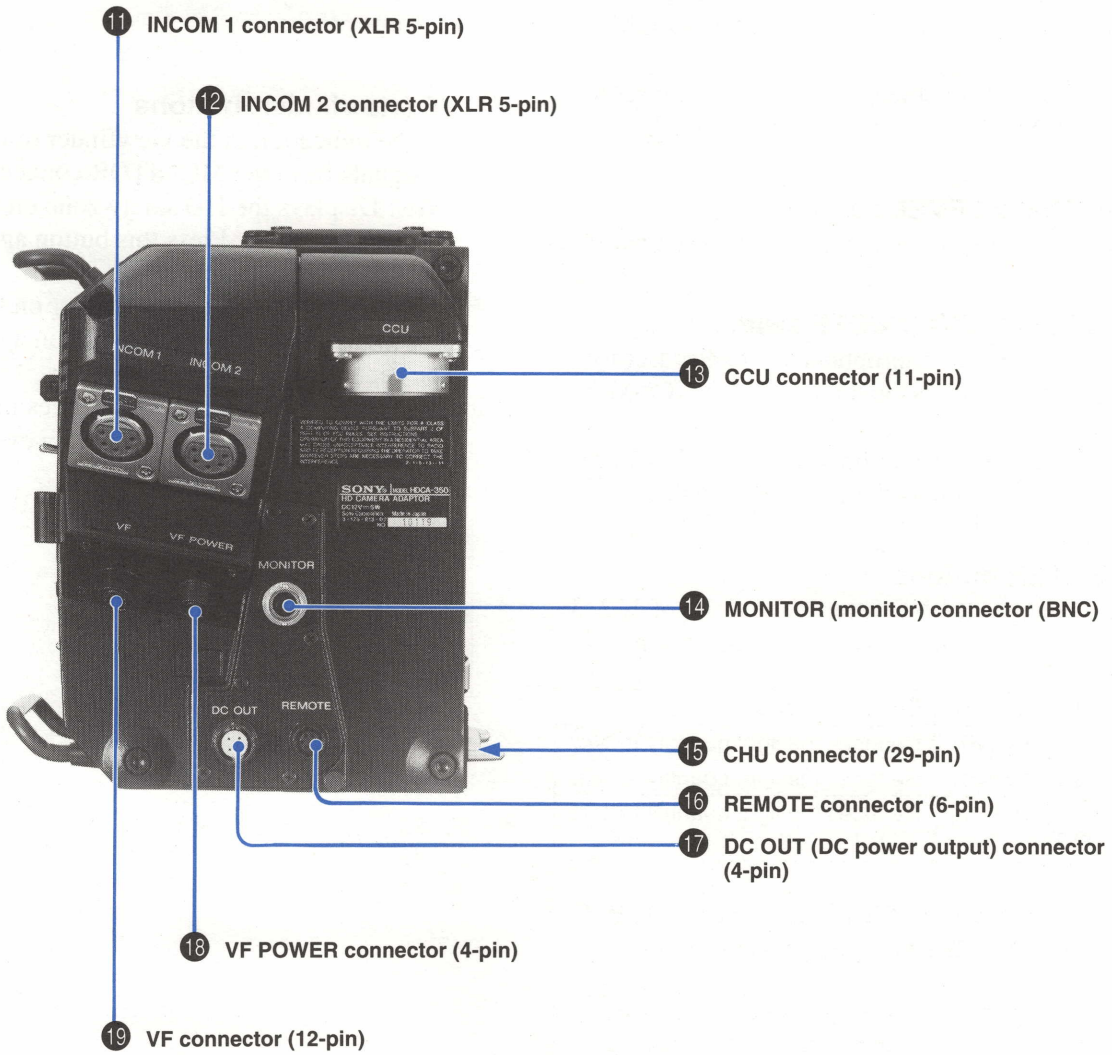
Selects the indication in the viewfinder or the output signals from the MONITOR connector.

FRAME: Displays the HD safety zone on the viewfinder screen. Press this button again. The safety zone disappears.

CENTER: Displays the center marker on the viewfinder screen. Press this button again. The center marker disappears.

SELECT: The displayed signal changes in the order of Y, G, B, R, RET, Y....whenever you press this button.

Y	Y signal
G	G component
B	B component
R	R component
RET	Return video



Connector panel

⓫ INCOM 1 connector (XLR 5-pin)
Inputs/outputs the INCOM 1 audio signal.

⓬ INCOM 2 connector (XLR 5-pin)
Inputs/outputs the INCOM 2 audio signal.

⓭ CCU connector (11-pin)
Used to connect to the CAMERA connector of the HDCS-350 HD camera signal processor.

⓮ MONITOR connector (BNC)
Outputs the black and white signal of one of the Y/G/B/R/RET signals (depending on the VF video select button setting).

⓯ CHU connector (29-pin)
Connect the camera adaptor connector of the HDC-500 HD color camera.

⓰ REMOTE connector (6-pin)
Connect the CAC-6 return video selector (not supplied) having the return video 1 ON/OFF, return video 2 ON/OFF and intercom microphone ON/OFF functions.

⓱ DC OUT (DC power output) connector (4-pin)
Supplies power for the script light.

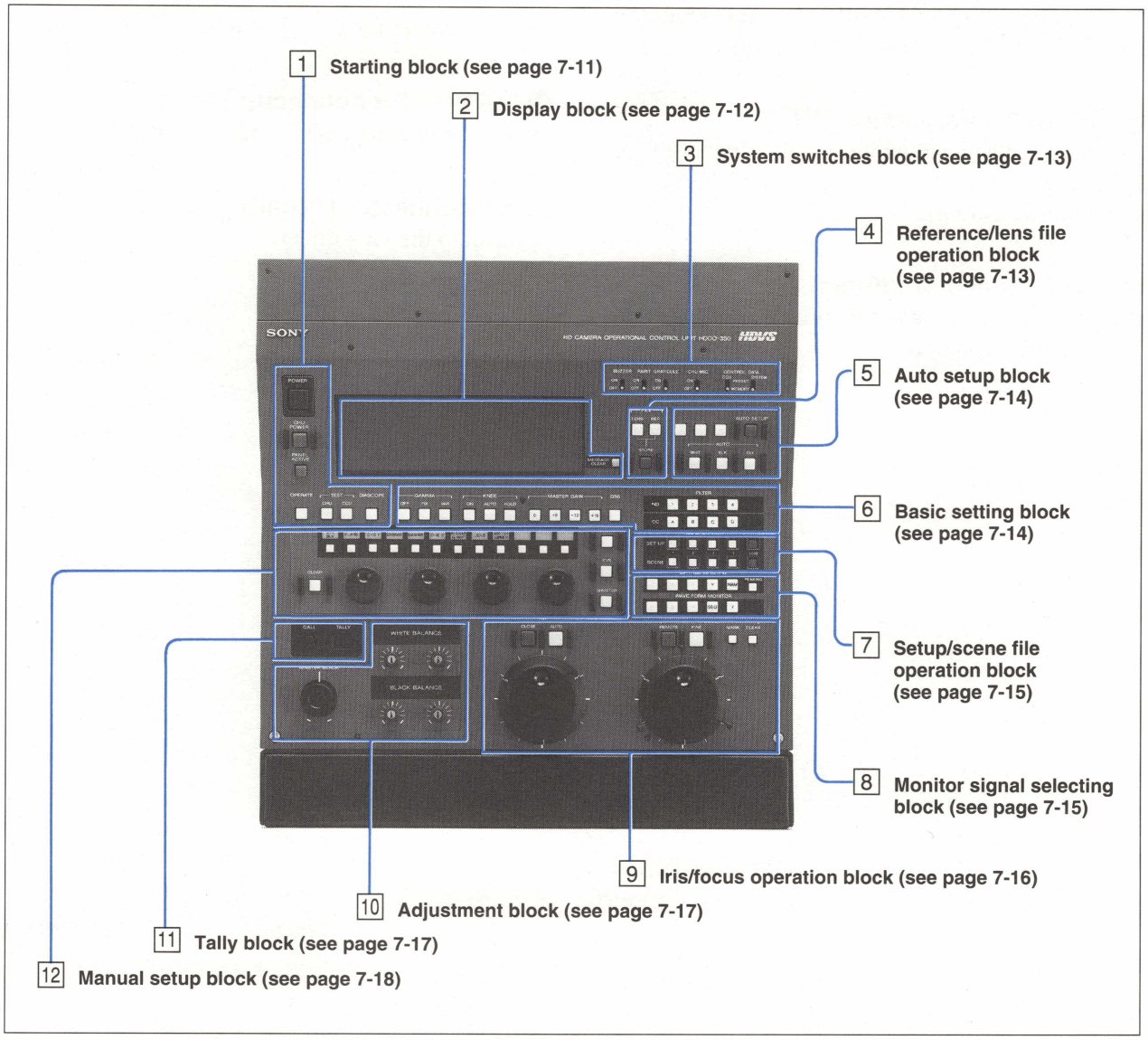
⓲ VF POWER connector (4-pin)
Supplies power to the 7-inch viewfinder.

⓳ VF connector (12-pin)
Connect to the viewfinder.

7-1-3 HDCO-350 HD Camera Operational Control Unit

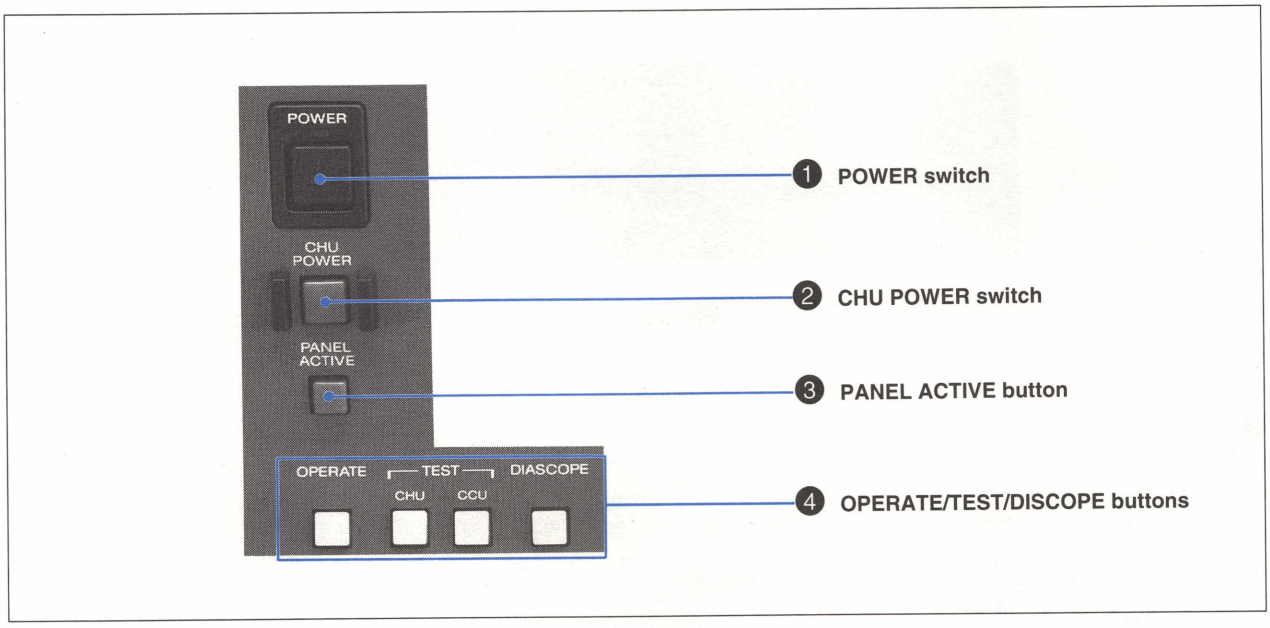
Operation panel

This panel consists of the following 12 blocks.


1 Starting block (see page 7-11)
2 Display block (see page 7-12)
3 System switches block (see page 7-13)
4 Reference/lens file operation block (see page 7-13)
5 Auto setup block (see page 7-14)
6 Basic setting block (see page 7-14)
7 Setup/scene file operation block (see page 7-15)
8 Monitor signal selecting block (see page 7-15)
9 Iris/focus operation block (see page 7-16)
10 Adjustment block (see page 7-17)
11 Tally block (see page 7-17)
12 Manual setup block (see page 7-18)

Operation panel

1 Starting block



Starting block

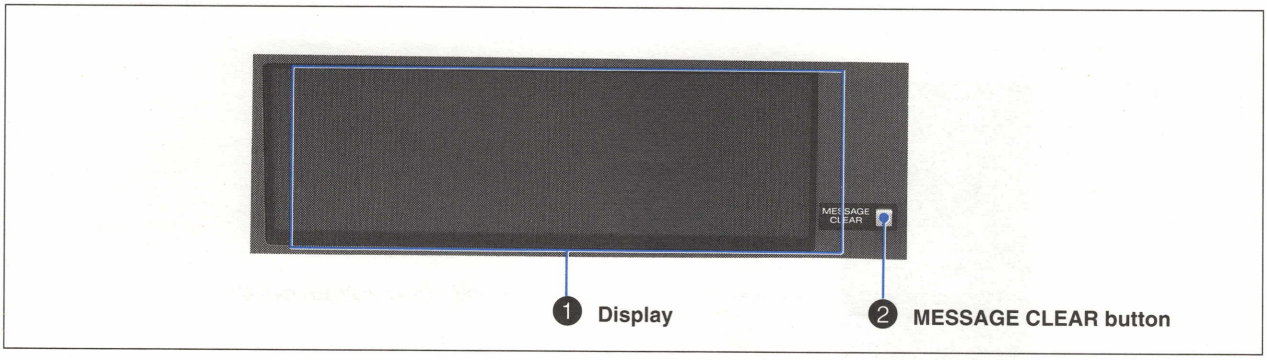
❶ POWER switch
Main power switch of the panel

❷ CHU POWER switch
Turns the HDC-500 HD color camera and HDCA-350 HD camera adaptor power on or off.

❸ PANEL ACTIVE button
Press this button to control the system from the panel. The lamp lights.

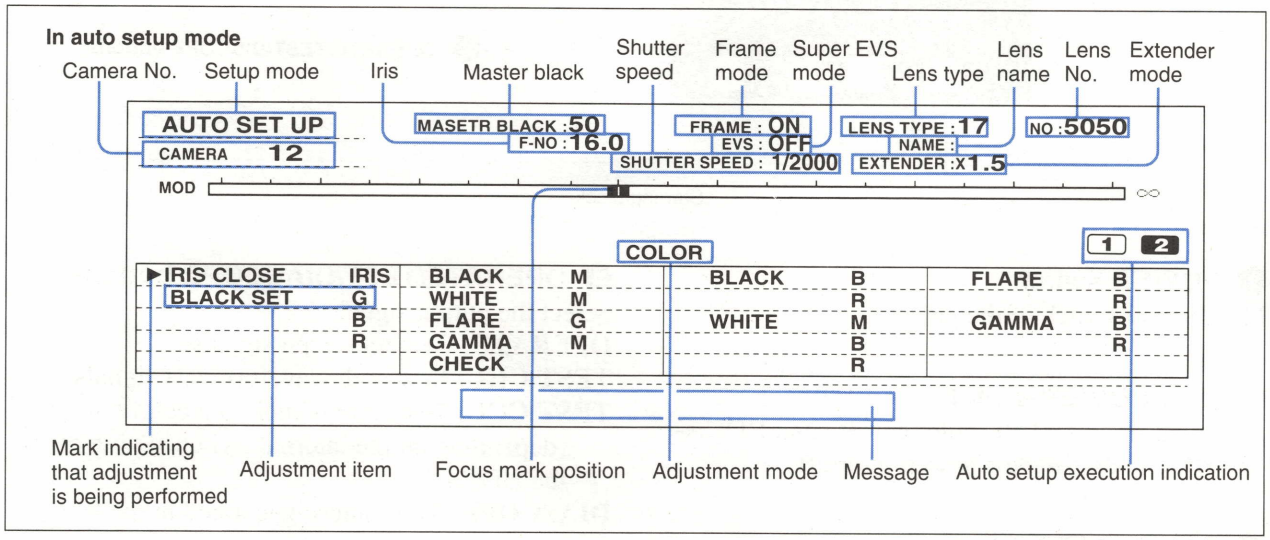
❹ OPERATE/TEST/DIASCOPE buttons
Select the output signal.
OPERATE: Camera screen signals
TEST CHU: Sawtooth waveform test signals
TEST CCU: Test signals such as a color bar, etc. (depending on the internal switch setting of the HDCS-350)
DIASCOPE: Test pattern generated in the lens

2 Display block

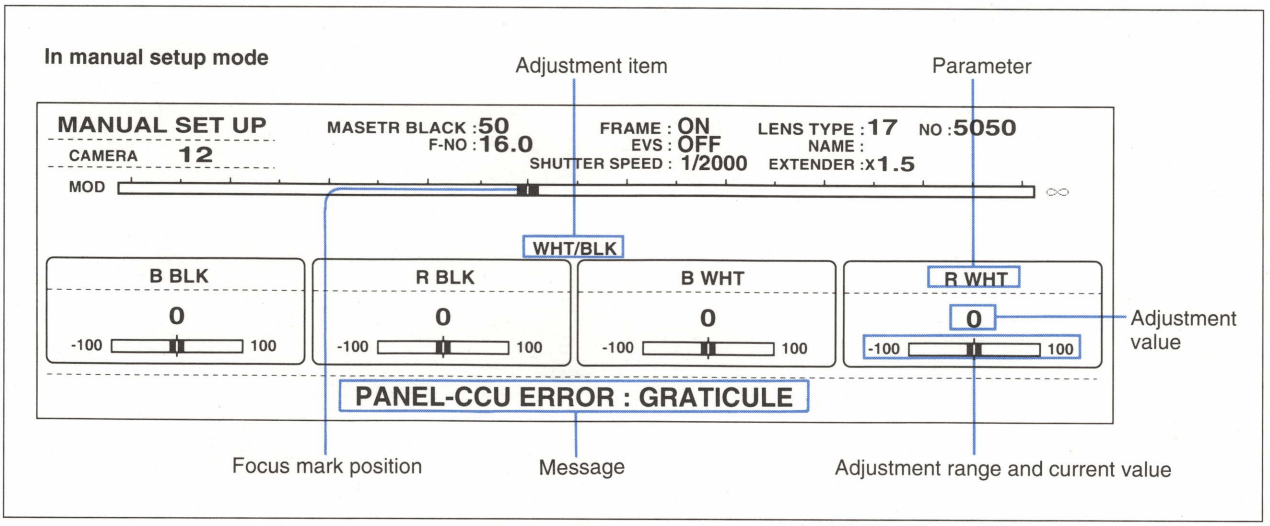


Display block

1 Display



Display at auto setup

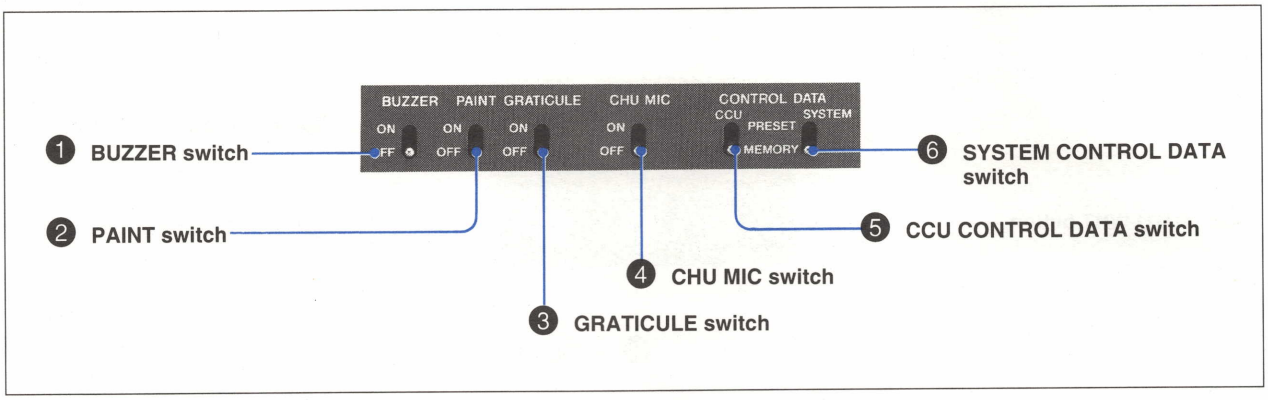


Display in manual setup mode

2 MESSAGE CLEAR button

Press the button to clear the message or display the next message.

3 System switches block



System switches block

1 BUZZER switch
Set this switch to ON to sound a buzzer whenever the TALLY lamp lights up or an error message is displayed.

2 PAINT switch
Set this switch to ON to make the B WHT/R WHT/B BLK/R BLK for manual adjustment effective.

3 GRATICULE switch
Set this switch to ON to display the center of the screen, HDTV safety zone and NTSC safety zone

4 CHU MIC switch
Set this switch to OFF to forcibly turn off the intercom microphone of the camera.

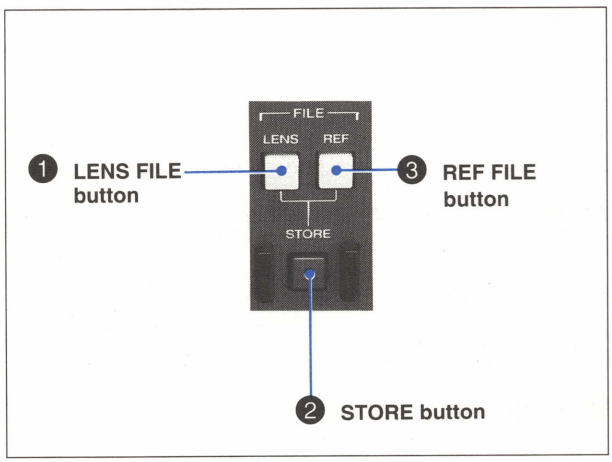
5 CCU CONTROL DATA switch
PRESET: Set the switch to this position to carry out adjustment using the CCU internal control. The manually adjusted value, set from the panel, becomes the center value of the adjustment range.

MEMORY: Set the switch to this position to perform manual adjustment from the panel.

6 SYSTEM CONTROL DATA switch
PRESET: Set the switch to this position to perform adjustment using the internal controls of the CCU or camera.
The manually adjusted value, set from the panel, becomes the center value of the adjustment range.

MEMORY: Set the switch to this position to perform adjustment from the panel.

4 Reference/lens file operation block



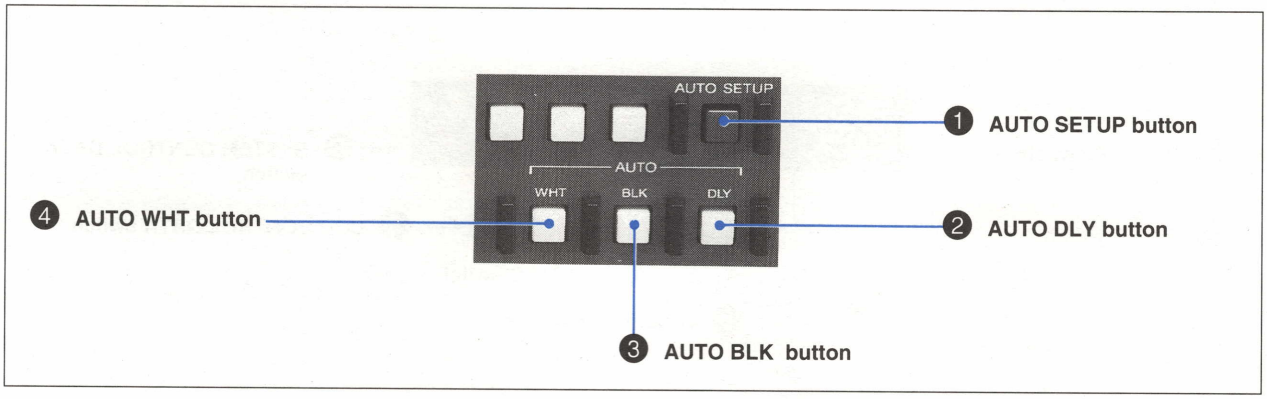
Reference file operation block

1 LENS FILE button
Press the button to light the lamp when registering or calling a lens file.

2 STORE button
Press the button to register settings in the lens or reference file. The lamp lights.

3 REF FILE button
Press the button to light the lamp when registering a reference file.

5 Auto setup block



Auto setup block

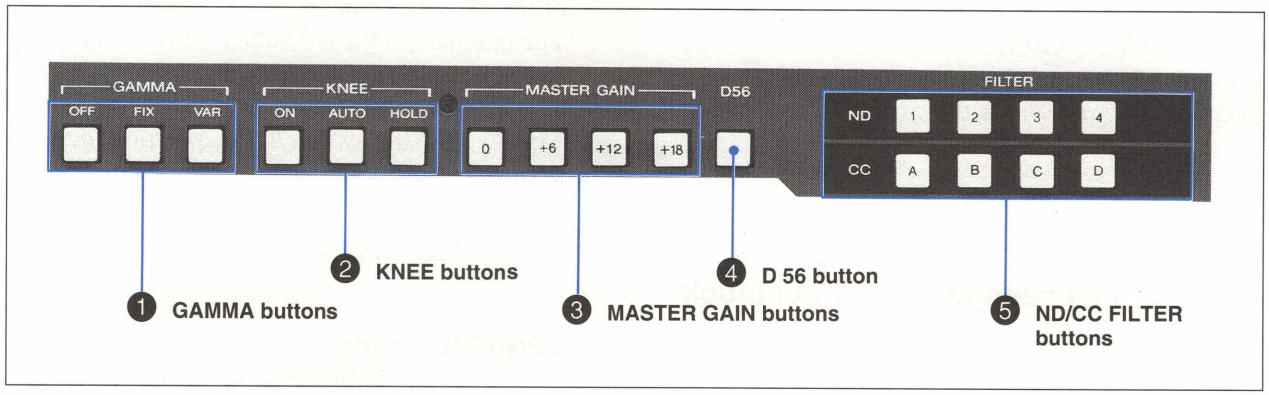
❶ AUTO SETUP button
Adjust the video signal level automatically.
Adjustment items are as follows.
Black set (G/B/R)/Black level (M/B/R) /Flare (G/B/R)/Gamma (M/B/R)

❷ AUTO DLY button
Automatically adjusts the delay between channels caused by cable transmission.

❸ AUTO BLK button
Adjusts the black balance automatically

❹ AUTO WHT button
Adjusts the white balance automatically.

6 Basic setting block



Basic setting block

❶ GAMMA buttons
OFF: Does not correct gamma.
FIX: Normally, set the switch to this position. Gamma curve of 0.45 is obtained.
VAR: Corrects the gamma manually.

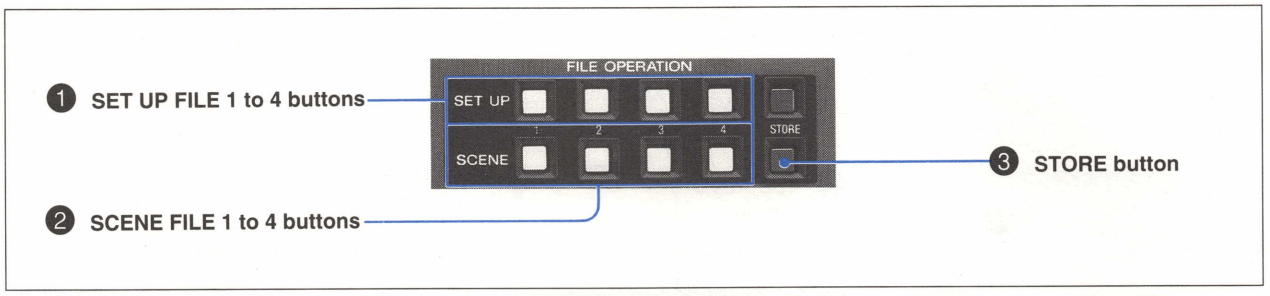
❷ KNEE buttons
ON: Set the button to ON to make the manually/automatically adjusted knee value effective.
AUTO: Adjust the knee automatically.
HOLD: Holds the auto-knee value.

❸ MASTER GAIN buttons
Select the master gain.

❹ D 56 button
Press this button to light the lamp when the color temperature is 5600 K.

❺ ND/CC FILTER buttons
Select the filter.

7 Setup/scene file operation block



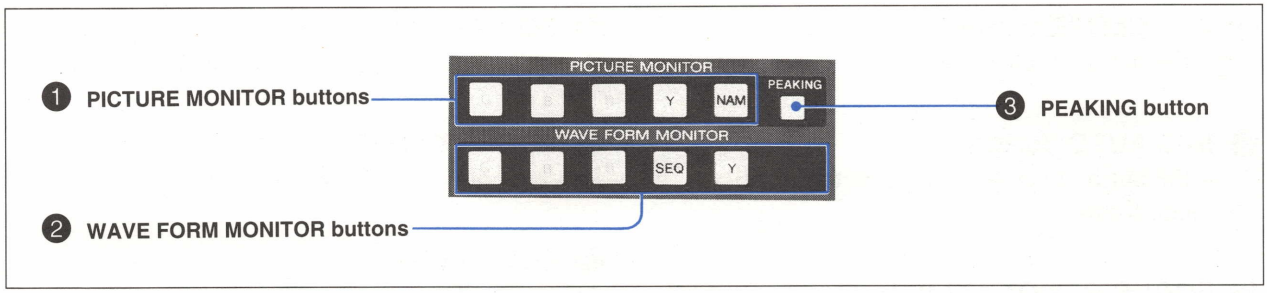
Setup/scene file operation block

1 SET UP FILE 1 to 4 buttons
Press the corresponding button to light the lamp when registering or calling a setup file.

2 SCENE FILE 1 to 4 buttons
Press the corresponding button to light the lamp when registering or calling a scene file.

3 STORE button
Press the button to light the lamp when registering a setup/scene file.

8 Monitor signal selecting block



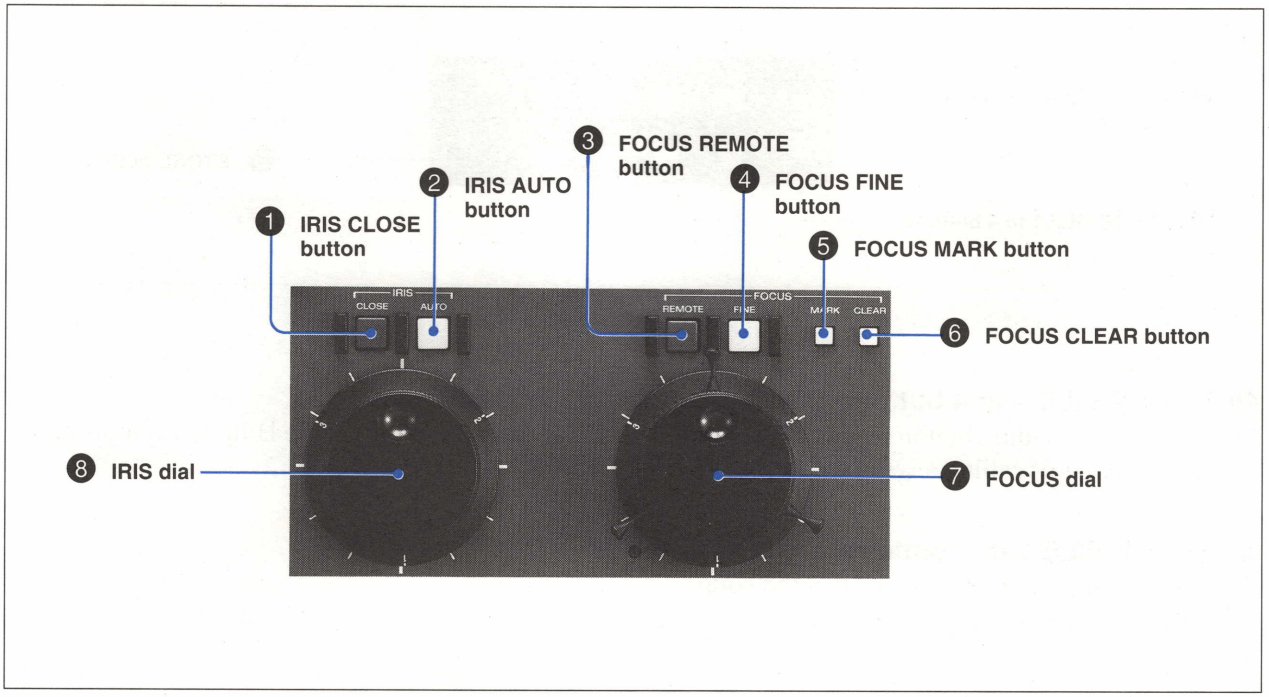
Monitor signal selecting block

1 PICTURE MONITOR buttons
Select the picture monitor signal.

2 WAVE FORM MONITOR buttons
Select the waveform monitor signal.

3 PEAKING button
Press this button to peak the picture contour of the picture monitor. The lamp lights.

9 Iris/focus operation block



Iris/focus operation block

❶ IRIS CLOSE button
Press the button to close the iris. The lamp lights.

❷ IRIS AUTO button
Press the button to adjust the iris automatically. The lamp lights.

❸ FOCUS REMOTE button
Press the button to adjust the focus using the FOCUS dial. The lamp lights up.

❹ FOCUS FINE button
Press the button to carry out fine adjustment of the focus using the FOCUS dial. The lamp lights.

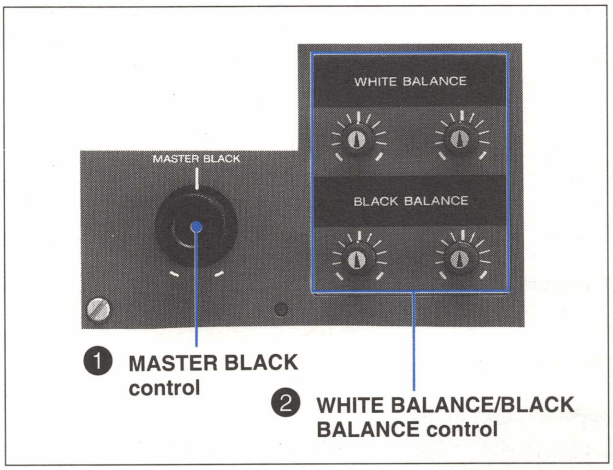
❺ FOCUS MARK button
Press the button to set the focus position marks.

❻ FOCUS CLEAR button
Press the button to delete all focus position marks.

❼ FOCUS dial
Adjusts the focus.

❽ IRIS dial
Adjusts the iris.

10 Adjustment block



File adjustment block

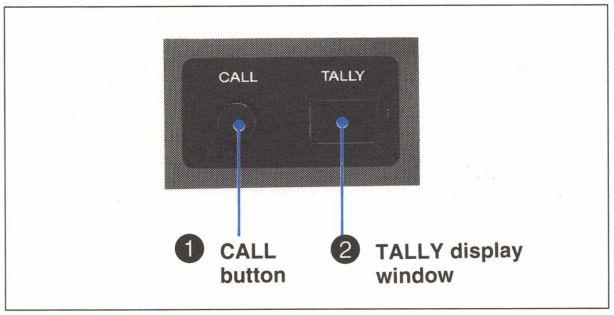
1 MASTER BLACK control

Adjusts the master black.

2 WHITE BALANCE/BLACK BALANCE control

Adjusts the white balance and the black balance.

11 Tally block



Tally block

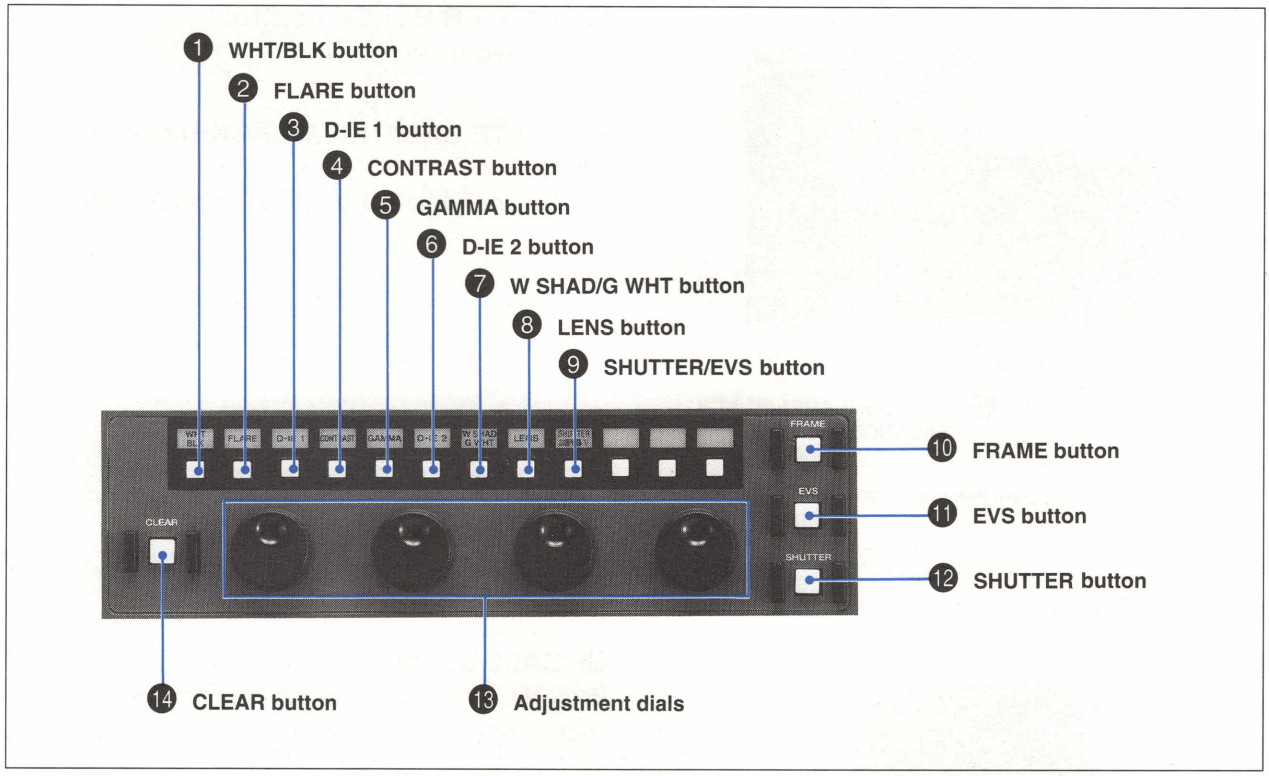
1 CALL button

Press the button to call a camera engineer or other engineer/producer in the field.

2 TALLY display window

Displays the corresponding camera No. when a camera engineer or other engineer/producer in the field presses the CALL button.
Set the camera No. with the switch inside the panel.

12 Manual setup block



Manual setup block

Buttons ❶ to ❾
Used to perform manual adjustments or create a lens file.
The setting and items of each button are explained below.

❶ WHT/BLK (white/black) button
Adjusts the white balance/black balance manually.

❷ FLARE button
Adjust the flare manually.

❸ D-IE 1 button
Adjusts the contour peaking manually.

❹ CONTRAST button
Adjusts the contrast manually.

❺ GAMMA button
Adjusts the gamma manually.

❻ D-IE 2 button
Adjusts the contour peaking manually

❼ W(White) SHAD/G WHT (White) button
Manual adjustment of white shading/G WHITE

❽ LENS button
Creates a lens file for the reference lens and other lenses.

❾ SHUTTER/EVS (enhanced vertical definition system) button
Sets the shutter speed/super EVS

❿ FRAME button
Press this button to select frame mode. The lamp lights.
Press this button again to select field mode. The lamp goes out.

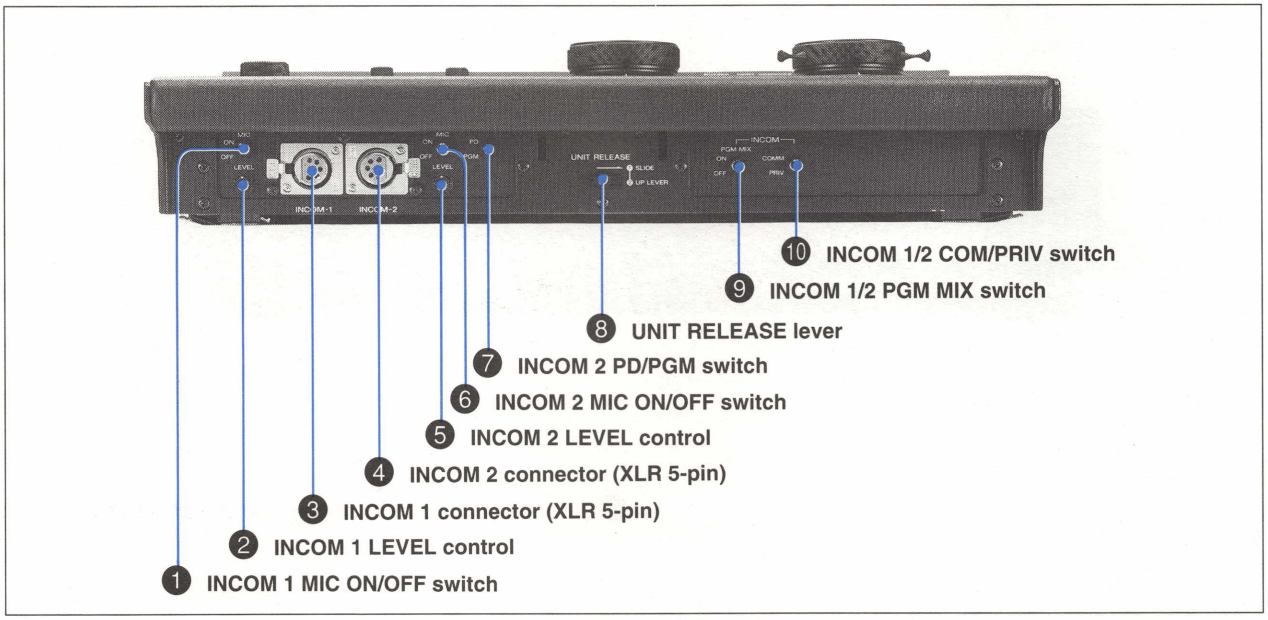
⓫ EVS button
Press to make super EVS effective. The lamp lights.

⓬ SHUTTER button
Press to make the shutter speed effective. The lamp lights.

⓭ Adjustment dials
Use these dials for manual adjustment.

⓮ CLEAR button
Press the button to clear a manually-adjusted value.

Intercom operation block


10 INCOM 1/2 COM/PRIV switch
9 INCOM 1/2 PGM MIX switch
8 UNIT RELEASE lever
7 INCOM 2 PD/PGM switch
6 INCOM 2 MIC ON/OFF switch
5 INCOM 2 LEVEL control
4 INCOM 2 connector (XLR 5-pin)
3 INCOM 1 connector (XLR 5-pin)
2 INCOM 1 LEVEL control
1 INCOM 1 MIC ON/OFF switch

Intercom operation block

❶ INCOM 1 MIC ON/OFF switch

ON: Transmits signals via the microphone of the headset for INCOM 1.
Receives and transmits INCOM 1 signals.

OFF: Set the switch to this position when you are not using the headset microphone.

❷ INCOM 1 LEVEL control

Adjusts the INCOM 1 audio level.

❸ INCOM 1 connector (XLR 5-pin)

Inputs/outputs INCOM 1 signals. Connect the headset to this connector.

❹ INCOM 2 connector (XLR 5-pin)

Inputs/outputs INCOM 2 signals. Connect the headset to this connector.

❺ INCOM 2 LEVEL control

Adjust the INCOM 2 audio level.

❻ INCOM 2 MIC ON/OFF switch

ON: Transmits signals from the microphone of the INCOM 2 headset.
Receives and transmits INCOM 2 signals.

OFF: Set the switch to this position when you are not using the headset microphone. You can receive the signals.

❼ INCOM 2 PD/PGM switch

PD: INCOM 2 is connected to the producer line.

PGM: INCOM 2 is connected to the program audio line.

❽ UNIT RELEASE lever

Use this lever to remove the panel when mounting.

❾ INCOM 1/2 PGM MIX switch

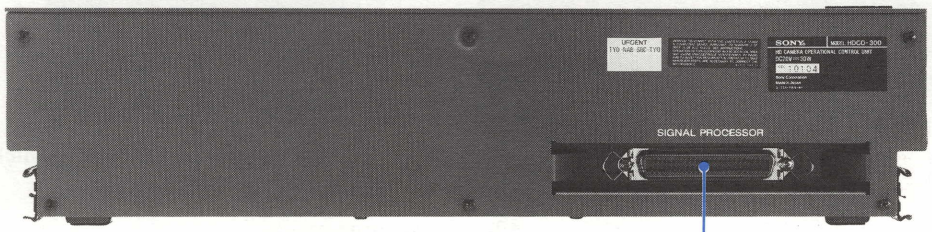
Set the switch to ON to mix the program audio to intercom lines 1 and 2.

❿ INCOM 1/2 COM (common)/PRIV (private) switch

COM: Intercom lines 1 and 2 are connected to the external INCOM lines.

PRIV: Intercom lines 1 and 2 are not connected to the external INCOM lines.

Connector panel



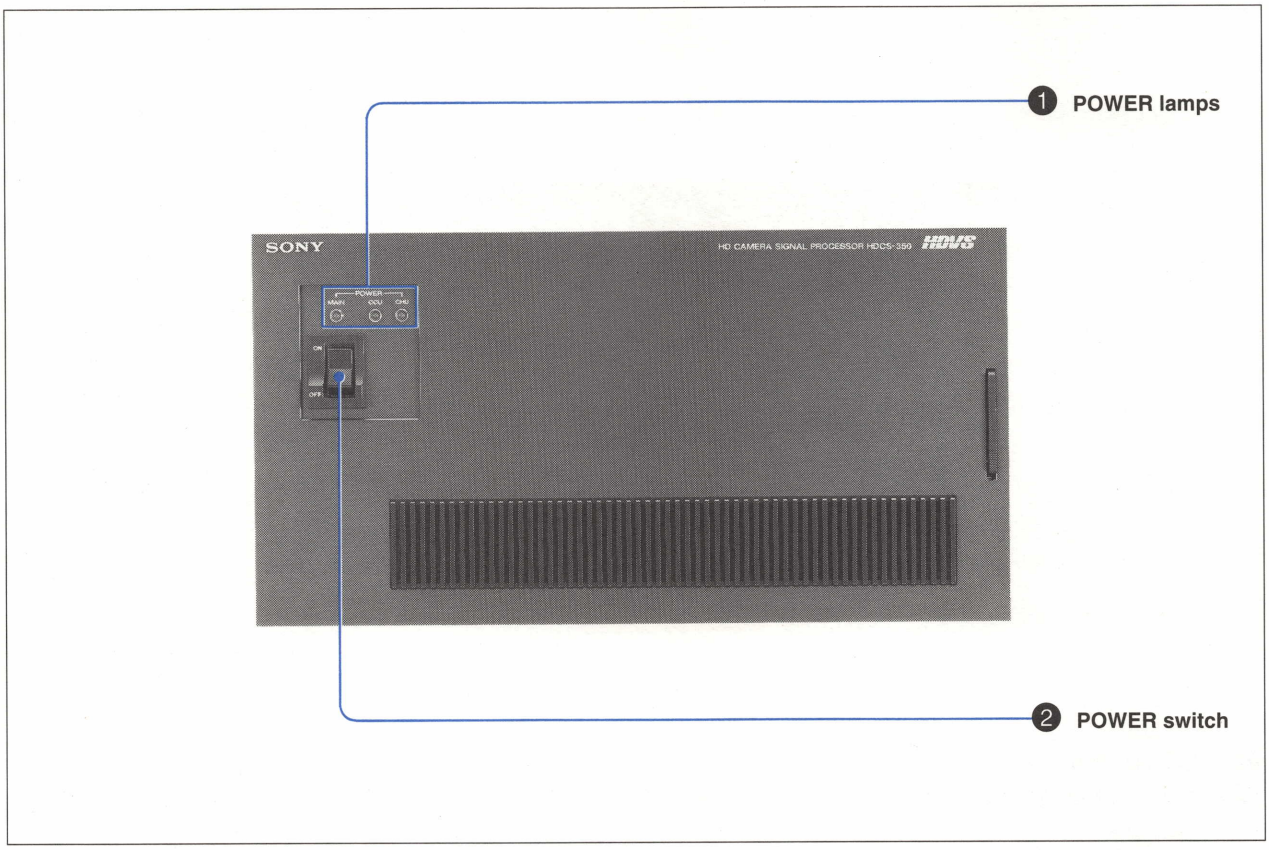
Rear panel

1 SIGNAL PROCESSOR connector (D-SUB 50-pin)

Used to connect to the OCU connector of the HDCS-350 HD camera signal processor

7-1-4 HDCS-350 HD Camera Signal Processor

Front panel



Front panel

❶ POWER lamps

MAIN: Lights when the unit's POWER switch is turned on.

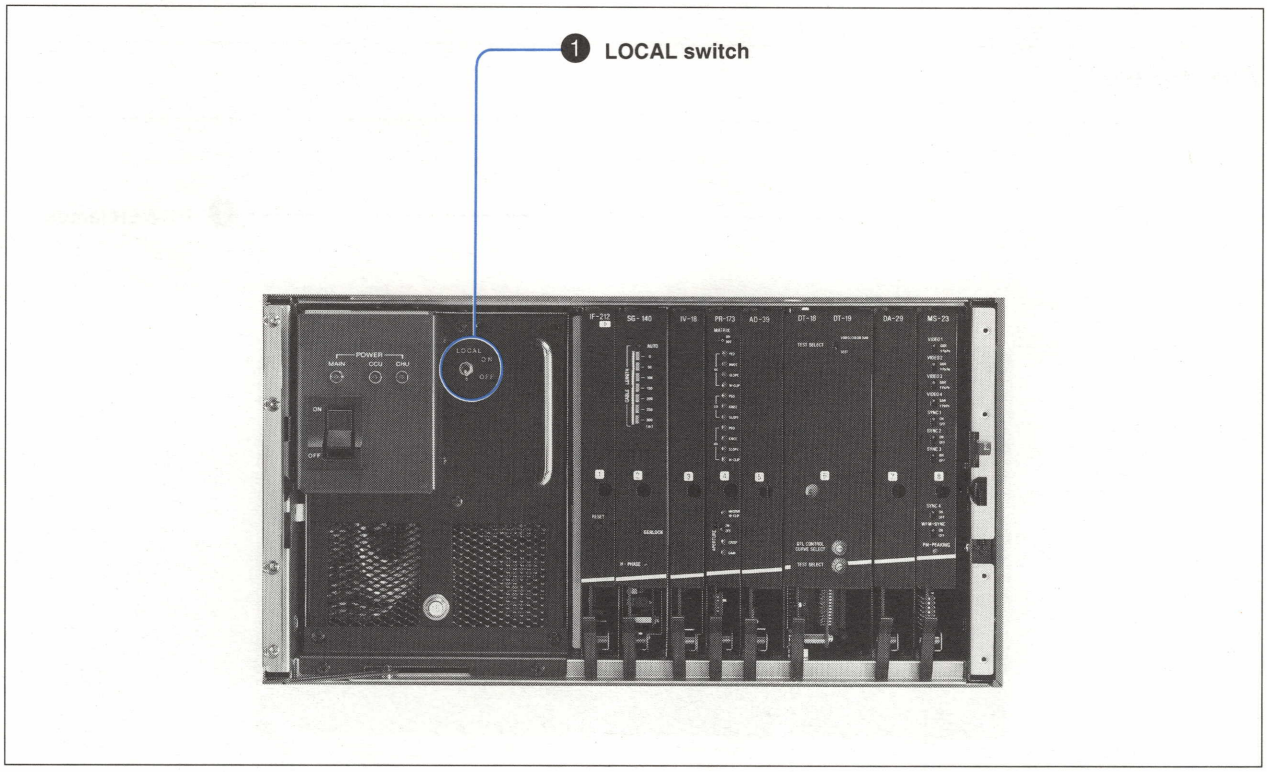
CCU: Lights when the panel is turned on.

CHU: Lights when the camera is turned on.

❷ POWER switch

Main power switch

Internal circuits

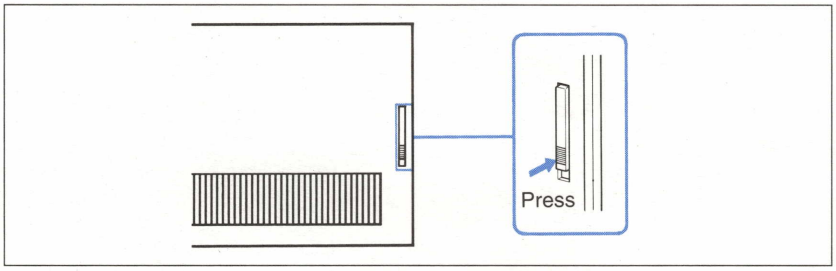


Internal circuits

❶ LOCAL switch

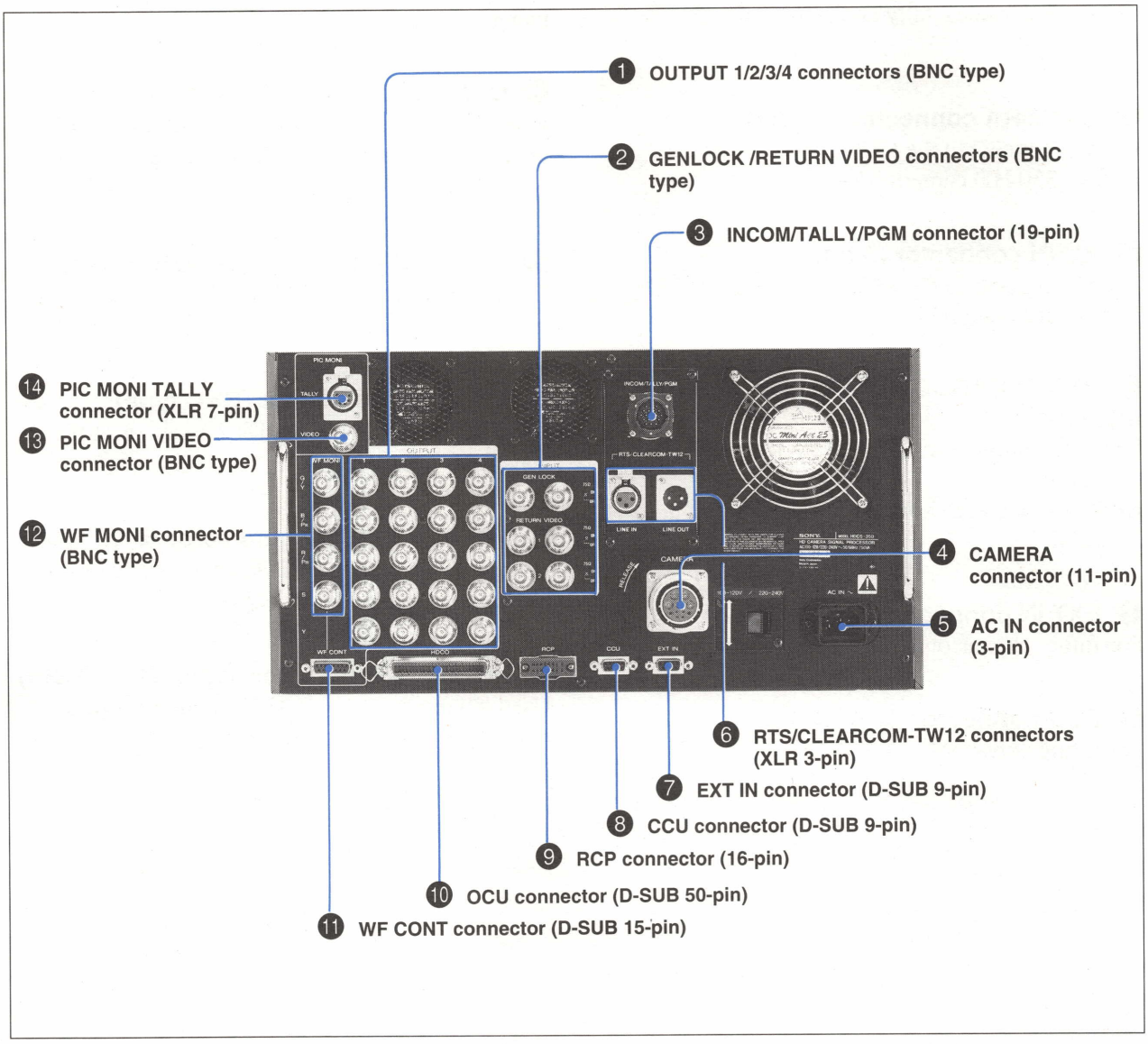
ON: Turns on the power of the unit independently of the panel.

OFF: Normally set the switch to this position.



How to open the door

Connector panel


1 OUTPUT 1/2/3/4 connectors (BNC type)
2 GENLOCK /RETURN VIDEO connectors (BNC type)
3 INCOM/TALLY/PGM connector (19-pin)
14 PIC MONI TALLY connector (XLR 7-pin)
13 PIC MONI VIDEO connector (BNC type)
12 WF MONI connector (BNC type)
4 CAMERA connector (11-pin)
5 AC IN connector (3-pin)
6 RTS/CLEARCOM-TW12 connectors (XLR 3-pin)
7 EXT IN connector (D-SUB 9-pin)
8 CCU connector (D-SUB 9-pin)
9 RCP connector (16-pin)
10 OCU connector (D-SUB 50-pin)
11 WF CONT connector (D-SUB 15-pin)

Connector panel

❶ OUTPUT 1/2/3/4 connectors (BNC type)

Output R,G,B,S (sync) and Y video signals. To output Y, P_B and P_R signals, open the front door, then change the switch setting of the MS-23 board inside the panel.

❷ GENLOCK /RETURN VIDEO connectors (BNC type)

GENLOCK Connector: Input the tri-level bipolar sync signal used to genlock the camera. (When the reference signal is not used, the camera is automatically driven by the internal sync.)

RETURN VIDEO 1/2 connectors (BNC type): Input the return video signals 1 and 2.

For GENLOCK and RETURN VIDEO 1/2, input signals to either the right or left connectors.

75 Ω switches: Set the 75 Ω termination switch to OFF when you are using the other channel for "loop-through" output.
Set the 75 Ω termination switch to ON when you are using only one connector.

❸ INCOM/TALLY/PGM connector (19-pin)
A four-line connector for intercom (engineering and producer lines, tally and program audio connection).

❹ CAMERA connector (11-pin)
Used to connect to the CCU connector of the HDCA-350 HD camera adaptor

❺ AC IN connector (3-pin)
Used to connect to the AC outlet using the AC power cord (supplied).

❻ RTS/CLEARCOM-TW12 connectors (XLR 3-pin)
LINE IN connector: RTS/CLEARCOM input connector
LINE OUT connector: Loop-through output to LINE IN

❼ EXT IN connector (D-SUB 9-pin)
For future expansion

❽ CCU connector (D-SUB 9-pin)
For future expansion

❾ RCP connector (16-pin)
Used to connects the HDCR-350 remote control panel.

❿ OCU connector (D-SUB 50-pin)
Used to connect to the SIGNAL PROCESSOR connector of the HDCO-350 HD camera operational control unit.

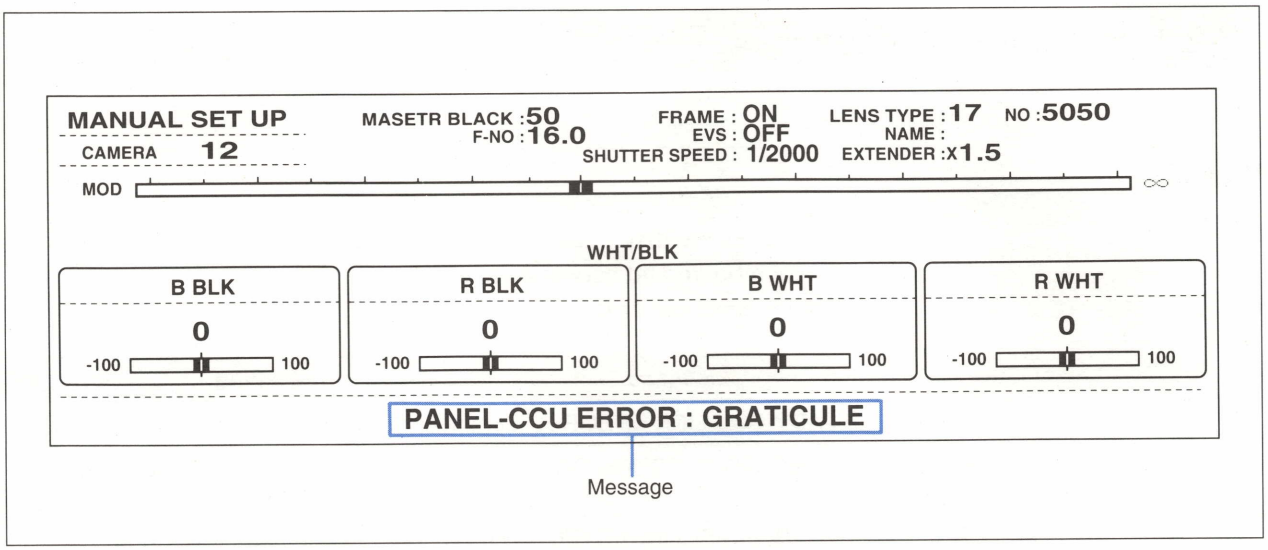
⓫ WF CONT connector (D-SUB 15-pin)
Used to connect to the REMOTE connector of the waveform monitor.

⓬ WF MONI connector (BNC type)
Used to connect to the INPUT connector of the waveform monitor.

⓭ PIC MONI VIDEO connector (BNC type)
Used to connect to the VIDEO IN connector of the black and white picture monitor.

⓮ PIC MONI TALLY connector (XLR 7-pin)
Used to connect to the TALLY connector of the black and white picture monitor.

7-2 Warning System



Message display block

There are three types of error messages:

WARNING	Displayed with the highest priority
ALARM	Displayed only in the absence of WARNING
ERROR	Displayed only in the absence of WARNING and ALARM

7-2-1 Meanings of Messages

Warning

Messages are displayed upon the occurrence of communication errors in each board and between the units.
(In alphabetical order)

Message	Meaning
ADP-CCU LINK ERROR	Communication failure between ADP and CCU
ANALOG THROUGH ON	The switch on the SG board of CCU is set to ON or another board is missing.
CABLE DISCONNECTED	The cable connection between CCU and CCUADP is defective.
CCU-ADP AU BOARD NG	The AU board of CCU-ADP is defective.
CCU-ADP DL BOARD NG	The DL board of CCU-ADP is defective.
CCU-ADP IV BOARD NG	The IV board of CCU-ADP is defective.
CCU-ADP SG BOARD NG	The SG board of CCU-ADP is defective.
CCU-ADP SW BOARD NG	The SW board of CCU-ADP is defective.
CCU-ADP VDA BOARD NG	The VDA board of CCU-ADP is defective.
CCU FAN OFF	FAN-1/2 of CCU is defective.
CCU MS LOCAL	The switch on the MS board of CCU is set to LOCAL.
CCU-PANEL LINK ERROR	Communication failure between CCU and panel.
CCU PR LOCAL	The switch on the PR board of CCU is set to LOCAL.
CCU SG ERROR	The SG board of CCU is defective.
CHU-ADP LINK ERROR	Communication failure between CHU and ADP.
CHU CN BOARD NG	The CN board of CHU is defective.
CHU OVER HEAT	CHU has overheated.
CHU SH BOARD NG	The SH board of CHU is defective.
CHU SV BOARD NG	The SV board of CHU is defective.
CHU SW BOARD NG	The SW board of CHU is defective.
CHU TG BOARD NG	The TG board of CHU is defective.
CHU VA BOARD NG	The VA board of CHU is defective.
D-IE POWER OFF	The D-IE ON/OFF switch on the IF board of CCU is set to OFF.
MARKER LOCAL	The MARKER switch on the SG board of CCU is set to LOCAL.
WINDOW LOCAL	The WINDOW switch on the SG board of CCU is set to LOCAL.

Alarm messages

CONDITION ERROR (Some adjustment conditions are not satisfied.)

AUTO BLACK BALANCE	AUTO WHITE BALANCE
AUTO COLOR	REFERENCE
AUTO DELAY	

Press the MESSAGE CLEAR button when one of the above messages appears. One of the following details, corresponding to the present condition, will appear.

DELAY BYPASS ON	ENCODER CLEAR
CCU PRESET	GAMMA SELECT
GAIN SELECT	ND FILTER SELECT
IRIS CLOSE	PANEL GREEN TALLY/CALL
OPERATE/TEST CHU/TEST CCU	SCENE
PANEL RED TALLY/CALL	SYSTEM PRESET
VIDEO PRESET	WAITING, TRY AGAIN
CC FILTER SELECT	

EEP-ROM WRITE ERROR (Data writing to EEP ROM failure.)

COLOR FILE SETUP FILE	REFERENCE FILE
F. NO	SCENE FILE
LENS FILE	

CCU MEMORY ERROR (CCU memory lost.)

REFERENCE FILE	DELAY FILE
SCENE FILE	BASE FILE
SETUP FILE	

CHU MEMORY ERROR (Camera memory lost.)

LENS FILE

Other alarm messages

Alarm message - others

Message	Meaning
BLACK LEVEL ERROR	Black level is incorrect.
CHU (or-CCU) COLD START	Power has been turned on with RAM data (backed up by a condenser) of camera or CCU lost. Auto-setup data stored in the EERROM will be read.
ENCODER RANGE OVER	Beyond range adjustable with controls
NEW LENS FILE	Lens file has not been registered.
NOT PERMITTED TO CONTROL	In the control protected mode.
NO ROOM FOR LENS	The EEPROM is full.
EXCESSIVE ERROR	Exceeding normal range
OUT OF RANGE	Error of checking the adjusted value at automatic adjustment.

Error messages

PANEL-CCU ERROR: [ ] Communication failure between the panel and CCU.

AUTO COLOR START
AUTO COLOR STOP
AUTO DELAY COMPENSATION START
AUTO DELAY COMPENSATION END
AUTO WHITE BALANCE START
AUTO WHITE BALANCE STOP
AUTO BLACK BALANCE START
AUTO BLACK BALANCE STOP

CC FILTER SELECT
CCU PRESET
CHU MIC
CHU POWER
CHU RED TALLY/CALL

DIASCOPE CONTROL
D56

ENCODER
ENCODER CLEAR
EVS

GAIN SELECT
GAMMA SELECT
GRATICULE

INCOM PANEL MIC 1
INCOM PANEL MIC 2
INCOME PANEL MIX
INCOM PGM/PRODUCER
SET UP
INCOM PRIVATE/COMMON

INITIAL DATA

KNEE MODE CONTROL

LENS
LENS DATA
LENS FILE
LENS SWITCH

MASTER BLACK

ND FILTER SELECT

OPERATE/TEST CHU/TEST CCU

PANEL ACTIVE
PANEL RED TALLY/CALL
PAINTING
PAINTING MODE
PAINTING ABSOLUTE MODE
PICTURE MONITOR PEAKING
PICTURE MONITOR

REFERENCE FILE
REFERENCE FILE GENERATION START
REFERENCE FILE GENERATION STOP

SCENE
SCENE ABSOLUTE MODE
SHUTTER SPEED
SYSTEM PRESET

WAVEFORM MONITOR

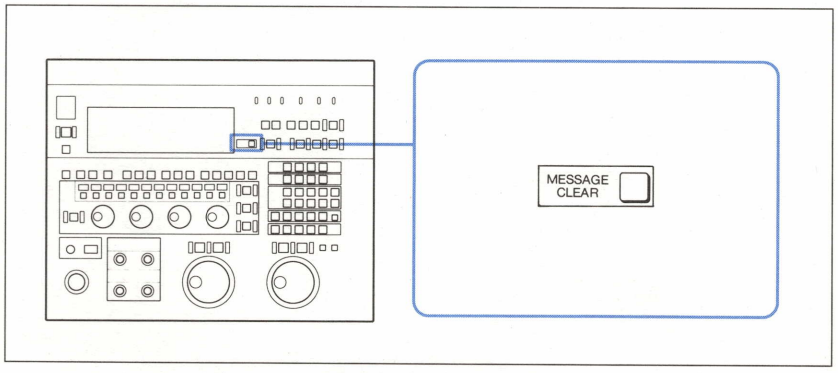
CHU-ADP ERROR: [ ] Communication failure between camera adaptor and camera

- LENS
- LENS FILE
- ENCODER CLEAR
- ENCODER
- GAIN SELECT
- CC-FILTER SELECT
- ND-FILTER SELECT
- LENS DATA
- SYSTEM PRESET
- D56
- FRAME
- TEST CHU
- INITIAL DATA
- CHU POWER
- DIASCOPE CONTROL
- RED TALLY/CALL
- GREEN TALLY
- EXTENDER CONTROL
- AUTO WHITE BALANCE START
- AUTO WHITE BALANCE NORMAL END
- AUTO WHITE BALANCE STOP/ABNORMAL END
- AUTO BLACK BALANCE START
- AUTO BLACK BALANCE NORMAL END
- AUTO BLACK BALANCE STOP/ABNORMAL END
- AUTO DELAY COMPENSATION START
- AUTO DELAY COMPENSATION NORMAL END
- AUTO DELAY COMPENSATION STOP/ABNORMAL END
- AUTO COLOR START
- AUTO COLOR NORMAL END
- AUTO COLOR STOP/ABNORMAL END
- REFERENCE FILE GENERATION START
- REFERENCE FILE GENERATION NORMAL END
- REFERENCE FILE GENERATION STOP/ABNORMAL END
- AUTO G-FLARE
- AUTO R/B-FLARE
- AUTO G/B/R-WHITE
- AUTO R/B-WHITE
- AUTO G-PULSE CANCELLER
- AUTO R/B-PULSE CANCELLER
- SHUTTER SPEED CONTROL
- SUPER-V CONTROL
- INTEGRATION

ADP-CCU ERROR: [ ] Communication failure between camera adaptor and CCU

- LENS
- LENS FILE
- ENCODER CLEAR
- ENCODER
- GAIN SELECT
- CC-FILTER SELECT
- ND-FILTER SELECT
- LENS DATA
- SYSTEM PRESET
- D56
- FRAME
- TEST CHU
- INITIAL DATA
- CHU POWER
- DIASCOPE CONTROL
- RED TALLY/CALL
- GREEN TALLY
- CABLE LENGTH
- EXTENDER CONTROL
- AUTO WHITE BALANCE START
- AUTO WHITE BALANCE NORMAL END
- AUTO WHITE BALANCE STOP/ABNORMAL END
- AUTO BLACK BALANCE START
- AUTO BLACK BALANCE NORMAL END
- AUTO BLACK BALANCE STOP/ABNORMAL END
- AUTO DELAY COMPENSATION START
- AUTO DELAY COMPENSATION NORMAL END
- AUTO DELAY COMPENSATION STOP/ABNORMAL END
- AUTO COLOR START
- AUTO COLOR NORMAL END
- AUTO COLOR STOP/ABNORMAL END
- REFERENCE FILE GENERATION START
- REFERENCE FILE GENERATION NORMAL END
- REFERENCE FILE GENERATION STOP/ABNORMAL END
- AUTO G-FLARE
- AUTO R/B-FLARE
- AUTO G/B/R-WHITE
- AUTO R/B-WHITE
- AUTO G-PULSE CANCELLER
- AUTO R/B-PULSE CANCELLER
- AUTO G-DELAY
- AUTO R/B-DELAY
- SHUTTER SPEED CONTROL
- SUPER-V
- INTEGRATION

7-2-2 Erasing Error Messages



Erasing an error message

Press the MESSAGE CLEAR button so that the error message will disappear.

7-3 Specifications

7-3-1 Overall Specifications of the System

Sensitivity	F8.0 (2000 lx, 3200 K, reflection ratio 89.9 %)
S/N	54 dB (Y: 30 MHz)
Registration error	0.025 %
Resolution	1000 TV lines
Horizontal frequency	33.75 KHz, 1125 lines/frame
Vertical frequency	60 Hz, 2:1 interlace
Power requirement	10.5 VDC to 17 VDC
Power consumption	750 VA

7-3-2 HDC-500 HD Color Camera

Pickup device system	1-inch FIT type Hyper HAD sensor CCD
Picture elements	2,000,000
System	GBR 3-chip system
Spectrum system	F1.2 high-index prism system
Built-in filters	CC filters: 3200 K, 4300 K, 6300 K, Cross filter ND filters: Through, 1/4, 1/8, 1/16
Weight	4.6 kg (10 lb 2 oz)
Dimensions	200 x 164 x 177 mm ($7^{7}/_{8}$ x $6^{1}/_{2}$ x 7 inches)
Sensitivity	F8.0 (2000 lx, 3200 K, reflection ratio 89.9 %)
S/N	54 dB (Y: 30 MHz)
Power consumption	30 W
Smearing	–100 dB
Lug	Under the measurement limit
Signal format	Conforming to BTA-S001 and SMPTE 240M ($11^{25}/_{60}$, aspect ratio 16 : 9, Tri-level bipolar synchronization)
Optic axis height	75.5 mm
Lens mount	1-inch HD standard bayonet mount, flangeback 68 mm
Scanning frequency	33.75 KHz
Connectors	LENS connector (12-pin) LENS POWER connector (4-pin) VF connector (12-pin) Camera adaptor connector (29-pin)
Power requirement	10.5 VDC to 17 VDC
Warm-up time	2 sec.
Operating temperature	0 °C to +40 °C (32 °F to 104 °F)
Storage temperature	–20 °C to +60 °C (–4 °F to 140 °F)

Supplied accessories	Handle (1) Rods (2) Tripod attachment (1) Extension board (1) Carrying case (1) Ball-point wrench (1) Operation guide (1) Maintenance manual (2)

7-3-3 HDCA-350 HD Camera Adaptor

General

Power consumption	5 W
Weight	1.9 kg (4 lb 3 oz)
Dimensions	155 x 166 x 115 mm (not including projecting parts and controls) (6 1/8 x 6 5/8 x 4 5/8 inches)
Supplied accessories	Connector panel (1) INCOM jack harness (1) Operation manual (2) Maintenance manual (2)

Input/output connectors

Output	MONITOR connector (BNC) VF connector (12-pin) VF POWER connector (4-pin) DC OUT connector (4-pin)
Input/output	INCOM 1 connector (5-pin) INCOM 2 connector (5-pin) CHU connector (29-pin) CCU connector (11-pin) REMOTE connector (6-pin)

7-3-4 HDCO-350 HD Camera Operational Control Unit

General

Operating temperature	0 °C to 40 °C (32 °F to 104 °F)
Storage temperature	–20 °C to 60 °C (–40 °F to 140 °F)
Dimensions	424 x 100 x 440 mm (w/h/d) (16 3/4 x 4 x 17 3/8 inches)
Weight	9.5 kg (20 lb 15 oz)

Supplied accessories	Rack angle (L), (R) (1 each) Rack mount assembly (F), (L), (R) (1 each) Screw and washer kit (1 set) INCOM panel assembly (1) Operation guide (1) Maintenance manual (2)

Input/output connectors

INCOM 1 connector (XLR 5-pin)
INCOM 2 connector (XLR 5-pin)
SIGNAL PROCESSOR connector (D-SUB 50-pin)

7-3-5 HDCS-350 HD Camera Signal Processor

Video output	Video: G, B, R or Y, P_B, P_R Sync addition: selectable Sync: Tri-level bipolar synchronization
Operating temperature	0 to 40 °C (32 °F to 104 °F)
Storage temperature	–20 °C to 60 °C (–4 °F to 140 °F)
Dimensions	424 x 221.2 x 486 mm (w/h/d) (16 3/4 x 8 3/4 x 19 1/4 inches)
Weight	About 33 kg (72 lb 12 oz)
Supplied accessories	AC power cord (2) Connecting cable (for HDCO-350) (1) Connecting cable (for waveform monitor) (1) TALLY cable (1) Round-type connector plug (1) Screw and washer kit (1 set) Conversion adaptor (1) Plug holder B (2) Rack angle (right/left) (1 each) Extension board (1) Operation guide (1) Maintenance manual (2)

Input/output connectors

OUTPUT 1/2/3/4 connectors (BNC type)
GENLOCK/RETURN VIDEO connectors (BNC type)
INCOM/TALLY/PGM connector (19-pin)
CAMERA connector (11-pin)
AC IN connector (3-pin)

RTS/CLEARCOM-TW12 connectors (XLR 3-pin)
EXT IN connector (D-SUB 9-pin)
CCU connector (D-SUB 9-pin)
RCP connector (16-pin)
OCU connector (D-SUB 50-pin)
WF CONT connector (D-SUB 15-pin)
WF MONI connector (BNC type)
PIC MONI VIDEO connector (BNC type)
PIC MONI TALLY connector (XLR 7-pin)

7-3-6 Recommended Equipment and Accessories

Viewfinders

Viewfinder
1.5-inch viewfinder HDVF-150
3-inch viewfinder HDVF-30
5-inch viewfinder HDVF-500
7-inch viewfinder HDVF-75

Viewfinder accessories
Pantilt table for HDVF-75 HKCF-750

Cables

CCU cable
HDCC-2A/5A/50A/100A

Optical fiber transmission system

Optical fiber transmitter HDFT-300
Optical fiber receiver HDFR-300
Optical fiber cable FC6-PA250/500
Cable extension connector FC6E-PA10

Remote control panel

Remote control panel HDCR-350

Post production system equipment

Switcher HDS-1000T
Telop camera HDST-1000T
EBR system

Digital VTR system equipment

Digital VTR HDD-1000
VTR signal processor HDDP-1000
Tape HD-1D-33A/48A/63A

Control unit

VTR control unit HDDR-1000
Audio remote control unit HDDR-A1000
Video remote control unit HDDR-V1000

Analog VTR system equipment

Analog VTR HDV-10
Tape HCT-63

Others

Digital frame recorder HDDF-500
Video disk player HDL-2000
NTSC down converter HDN-2000
Sync converter HDSC-1000

Display system equipment

Projector

HDIH-1200J/2000J/3000J
HDIR-550J

Color monitor

HDM-1430/2030/3030/4130

Black and white monitor

HDM-90/145

Design and specifications are subject to change without notice.

7-4 Glossary

Aliasing
Distortion of the signal caused by the overlap of the base band signal and the lower sideband signal when the signal is demodulated.

Aperture compensation
Compensation for frequency response deterioration, which occurs when sampling high frequency signals, due to a limited aperture of a CCD sensor.

Bayonet type
A type of lens mount. The lens is inserted into the lens mount and fixed in place by rotating a ring.

Black balance
To balance the black level of the R, G, and B signals so that black has no color.

Black set
A reference level for black balance adjustment.

Black shading compensation
An image should appear uniformly black when the iris is completely closed, but areas on the periphery of the image may appear tinted . This phenomenon is called black shading compensators.

CCD
Abbreviation of charge-coupled device. A semiconductor which is used in place of a camera tube. It converts light into electrical charge and outputs the electrical charge in the form of voltage variations.

Center maker
A cross that indicates the center of the image on the viewfinder screen.

Color bar signals
Test signals displayed on the screen as vertical stripes of different colors. Used for adjustment of hue, saturation of a video cam era and video monitor.

CC filter
Abbreviation of color conversion filter. A filter which converts the color temperature to the reference value so that the same tone of a picture is obtained in the different lighting conditions.

Color temperature
The color quality of lights, expressed in Kelvins (K). Color temperature is higher when the color is reddish and lower when bluish.

DCC
Abbreviation of dynamic contrast control. A circuit that allows the video camera to accpet a picture of wide luminace dynamic range.

Ff
See Flange focal length.

FIT
Abbreviation of Frame Interline Transfer. A type of CCD imager featuring substantially reduced vertical smear.

Flange focal length
A length between the objective lens and the surface of the imager.

Flangeback
Distance from the plane of lens mounting flange to the image focal plane.

Flare
Light unnecessary for the focus of image may stray into the image plane and interfere with the image. Flare is a loss of contrast in the image resulting from this phenomenon.

Flicker
Repeated change of brightness on the screen, which is caused by frequency difference between the camera's scanning and the variation s in the lighting.

Gen-lock
Abbreviation of Generator lock. Synchronizing every pieces of video equipment to a reference (master) sync.

HAD
Abbreviation of Hole-Accumulated diode. A CCD sensor structure designed to suppress certain types of noise inherent to CCDs.

Horizontal resolution
Resolution of the screen in the horizontal direction. It is expressed as the number of vertical lines which can be distinguished when shooting a test chart.

IRE-scale
A video level measurement scale standardized by the Institute of Radio Engineers, now called the Institue of Electrical and Electronic Engineers (IEEE).

Lag
Smear that follows a moving object across a stationary object. It occurs especially with color cameras and monochrome vidicon cameras at low light level.

Luminance signal
A signal that determines the brightness of the picture. Also, called the Y signal.

ND filter
Abbreviation of Neutral Density filter. ND filters reduce the amount of incident light equally across the entire visible wavelength range without affecting color.

Pedestal level
A black level which is absolute black level of a video signal. Normally, a video signal refers to the setup level (about 0 % to 10 % of video amplitude above the blanking level) as the black level.

Picture elements
Dots that compose an image. The more picture elements, the higher resolution of the picture.

Registration
Adjusting the scanning of the three G/B/R channels so that their images overlap (register) perfectly.

Return video
The video signal sent from a camera to a VTR is returned back to the camera or the video signal of the camera selected at the panel is returned back to the corresponding camera when using two or more cameras so that a cameraman can check the picture. This video signal returned back to the camera is called return video.

Sawtooth waveform
A video signal used to check linearity and other characteristics of video amplifiers.

S/N
Abbreviation of Signal-to-Noise ratio. The relation of the strength of the desired signal to the accompanying electronic interference, the noise. If S/N is high, sounds are reproduced with less noise and picture are reproduced clearly without snow.

Shutter speed
The length of time a shutter remains open. The higher the shutter speeds, the more clearly an moving object can be shot.

SMPTE
Abbreviation of Society of Motion Picture and Television Engineers, a professional association established in the U.S.A.

Vertical smear
A bright vertical line which appears on the screen when shooting a very bright object with a CCD video camera. Also called smear.

Video gain
Amount of amplification for video signals, expressed in decibels.

White balance
Adjustment of red, green and blue signal levels, so that white objects are reproduced correctly as true white.

White shading compensation circuit
When shooting a white object, the upper and lower portions of the screen may appear magenta or green while the central portion appea rs while the central portion appears white, depending on the performance of the camera lens. This is called shading and circuits to compensate this phenomenon are called white shading compensation.

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